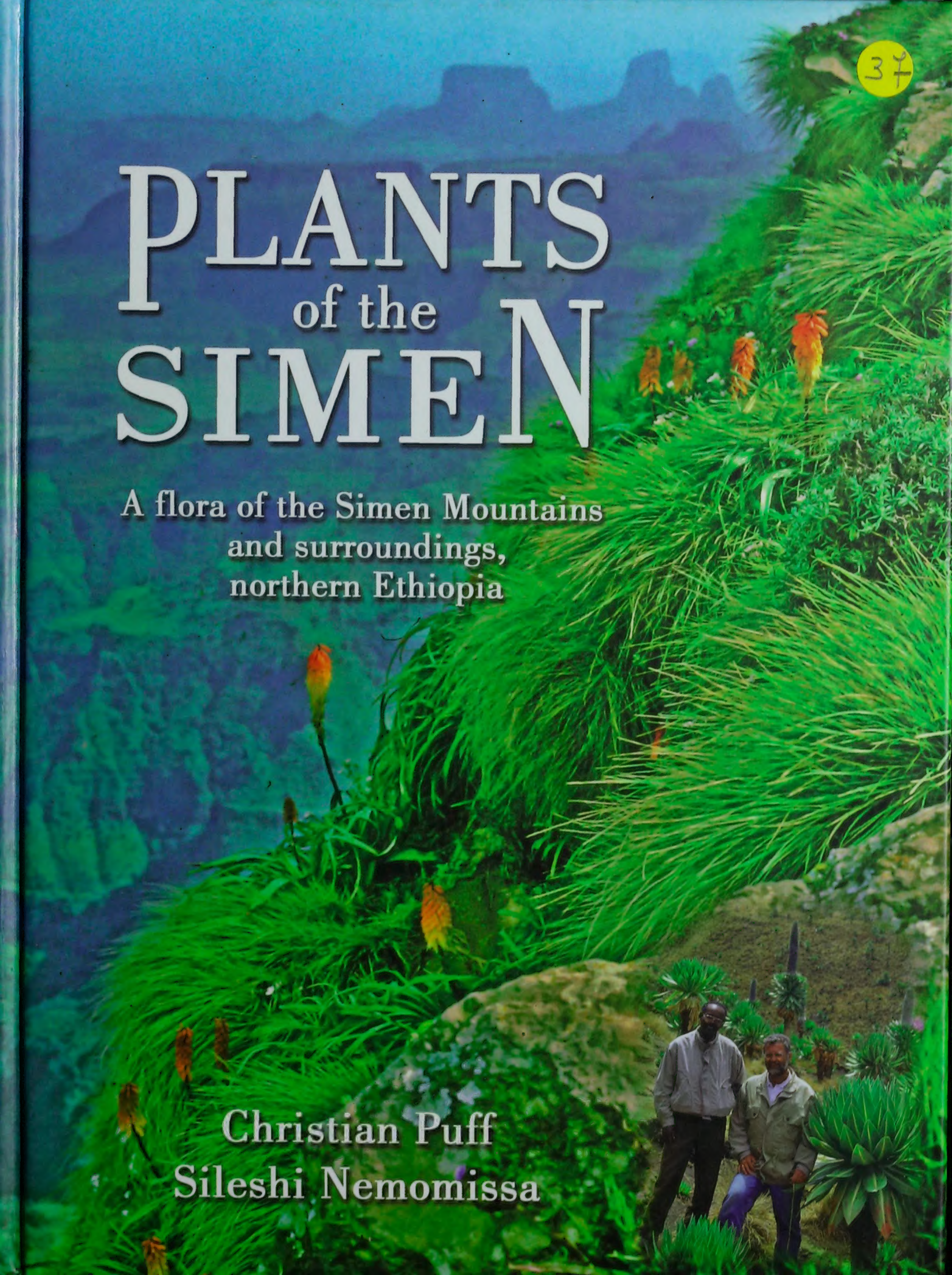
37
PLANTS
of the
SIMEN
A flora of the Simen Mountains
and surroundings,
northern Ethiopia
Christian Puff
Sileshi Nemomissa

Afroalpine grassland with Giant Lobelias (*Lobelia rhynchopetalum*)
(Simen Mountains National Park, Saha area).

Scripta Botanica Belgica

Volume 37

Dedicated to the late Dr. Georg Cufodontis, whose "Enumeratio Plantarum Aethiopiae, Spermatophyta" (1953 – 1972), published as a supplement to the Bulletin du Jardin Botanique de l'Etat, Bruxelles, has been an important contribution to the floristic knowledge of Ethiopia.

READING ROOM

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PLANTS OF THE SIMEN

A flora of the Simen Mountains and surroundings, northern Ethiopia

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SILESHI NEMOMISSA

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Front cover: view of Simen Lowlands from escarpment near Sankaber; flowering: stunted individuals of *Kniphofia foliosa* (Asphodelaceae)
Back cover: *Rosularia semiensis* (Crassulaceae), a Simen endemic
Photographs copyright © Christian Puff
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PREFACE

The Simen Mountains, a historical site from a botanical viewpoint and endowed with breath-taking and awe-inspiring landscape, have been sealed off to visitors and professionals for a long period of time due to adverse political conditions. Luckily, these times are behind us and for over a decade it has been possible to visit the mountains without major problems.

The idea to write this book was born during our first expedition to the mountains in 1996, but it took several additional expeditions, covering all parts of the Simen and surroundings and taking place at different times of the year, until we felt ready to actually start with the task of writing up.

Feeling the need to extend the wealth of botanical diversity knowledge also to locals, nature lovers and tourists to boost Eco-tourism in an Ethiopian context, we decided to design a book which does not require the readers to have an in-depth background in botany. Descriptions of plants are kept short, concentrating on the most important characters, and keys are provided whenever necessary; information on distribution, ecology and phenology are appended in abbreviated form. To make the book as user-friendly as possible, descriptions and corresponding illustrations are always on the same or on facing pages.

We sincerely hope that our book will help create awareness for biodiversity conservation among nature lovers, conservationists and policy makers who do not know botany but would like to know their surrounding environment.

We dedicate this book to the late Dr. Georg Cufodontis who not only aroused the first author's interest in Ethiopia but also had close links to the National Botanic Garden of Belgium. His "Enumeratio Plantarum Aethiopiae Spermatophyta" (1953—1972), the perhaps most important "knowledge base" for the current Flora of Ethiopia and Eritrea, has been published as a supplement to the *Bulletin du Jardin Botanique l'Etat, Bruxelles*, as it was then called. The first author, who "inherited" Cufodontis' small office at the Institute of Botany, Univ. of Vienna, after his retirement, will never forget his lively and exciting descriptions of his adventures in Africa during World War II.

We are extremely pleased and grateful that this close cooperation with the National Botanic Garden of Belgium continues to this day and that its head of Department of Vascular Plants, Prof. Dr. Elmar Robbrecht, agreed to publish this book.

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Acknowledgements

There are many people who, over the past nine years, have significantly contributed to making this book a reality. As it is not possible to thank all of them personally, we herewith extend our sincere thanks to everyone who supported us in one way or another.

The staff of the National Herbarium, Addis Ababa University (ETH), deserves special thanks for their help in processing and identifying specimens from the Simen.

We are grateful to the Amhara Regional State Bureau of Agriculture for providing permits to work in the Simen Mountains National Park and all members of the Park Management Office at Debark for their hospitality and logistic help.

Prof. B. Nievergelt of the University of Zurich, Switzerland, kindly invited us to participate in a primarily zoological expedition to the Simen and provided financial support.

The Austrian Government (Ministry of Foreign Affairs: bilateral project "Nature-Oriented Tourism Development in the Simen Mountains National Park, Ethiopia." Implementing agent: Bureau Falch), the Austrian Development Cooperation (ADC), the Austrian Academic Exchange (OeAD) and the University of Vienna are thanked for financial assistance, for logistic help and for funding visits to Ethiopia (CP) and to Austria (SM), respectively.

Introductory Part

At entrance to Dirni Gorge;
Mt. Silki area in the background;
a Giant Lobelia (*Lobelia rhynchopetalum*, Lobeliaceae)
in the foreground

INTRODUCTORY PART

GENERAL INFORMATION ON THE SIMEN AREA

When nature lovers and trekkers talk about the Simen* Mountains, one of the most spectacular landscapes in the world, they normally mean the *Simen Mountain National Park* (SMNP), a UNESCO Natural World Heritage Site. The Park, however, only covers a relatively small area (ca. 22,000 ha) in the western part of the extensive Simen Massif; the large, remote eastern part of the Massif includes the highest peak in Ethiopia, Ras Dejen* (4,543 m**). Thus, the present book on the plant life of the Simen, although concentrating on the National Park area, also includes plants recorded from elsewhere in the mountains.

The Simen is part of the Northern (or Northwestern) Ethiopian Mountain System and lies in the North Gondar Administrative Zone (previously Gondar Administrative Region and, in older times, Begemder Province), roughly 110 km Northeast of the town of Gondar [see fig. IP1]. Starting point of any expedition to the Simen is the small town of Debark, located along the road leading from Gondar on to Adi Arkay and the historical town of Aksum (or Axum) [see chapter Practical Tips for details]. The most scenic parts of the Simen lie some 20 km to the Northeast of Debark and can now be reached by road, but the westernmost part of the Simen escarpment lies only ca. 10 km North of the town; here, the Gondar – Aksum main road winds down the escarpment ("Wolkefit Pass") and provides very scenic views of the Simen (this area is part of the Lemalimo Wildlife Sanctuary, immediately to the West of Simen Mountains National Park).

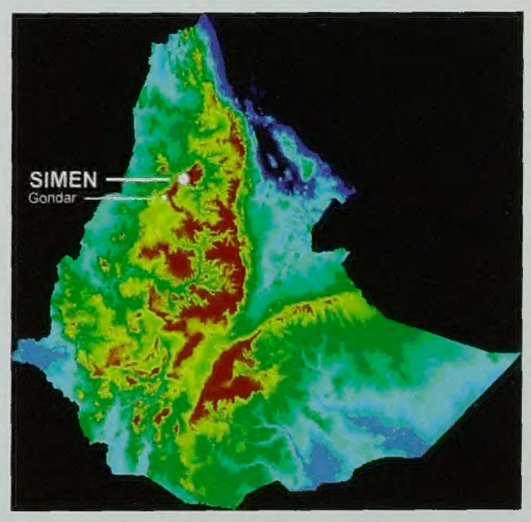


Fig. IP1. Relief map of Ethiopia and Eritrea (areas of 3,000 m a.s.l. and above are shown in red-brown). The Rift Valley divides the high mountain areas ("Ethiopian Highlands") into a large Northern (or Northwestern) and a smaller Southern (or Southeastern) Mountain System. The Simen is part of the Northern Mountain System; it lies within the North Gondar Administrative Zone (previously Gondar Administrative Region) and is located Northeast of the town of Gondar.

The Simen area consists of broad, undulating plateaux, generally above 3,000 m a.s.l. and reaching over 4,000 m in some areas [in the Botanical Part of this book referred to as Simen Uplands (UL)]. These plateaux are dissected by a number of river valleys, some of which are below 3,000 m. In the SMNP area, the main plateau is divided by the Jinbar river which runs roughly in a Northeast – Southwest direction before it turns sharply to the Northwest; in the South, the plateau drops of sharply to the valley of the Wazla Wenz (Wenz = river). Outside the SMNP (i.e. to the East), the Mesheha (or Meshaha), running roughly North – South, is the most prominent river; its valley bottom (ca. 2,800 m) is the lowest point in mountainous terrain which in several places reaches altitudes of over 4,400 m (Mt. Bwahit, Mt. Silki, Ras Dejen, and others). On the South and the Northeast the entire Simen Massif is bounded by the deep valleys of the Tekeze (or Tacazze) river and its tributaries.

* As the standard transcription from the Amharic has not always been adhered to (or did not exist in the past), spellings of place names found in literature vary. Apart from the standard "Simen," the mountains are also referred to as *Simien*, *Semien* or *Semen*, and the highest mountain of Ethiopia as *Ras Dashen*, *Ras Dashan* or *Ras Dajen* instead of Ras Dejen. These spelling variations are also reflected by names of plant species originally described from and called after the Simen, e.g., *Clematis simensis* or *Rosularia semiensis*.

** In older maps and literature, the altitude of Ras Dejen is often given as 4,620 m; new data suggest that the correct altitude is 4,543 m.

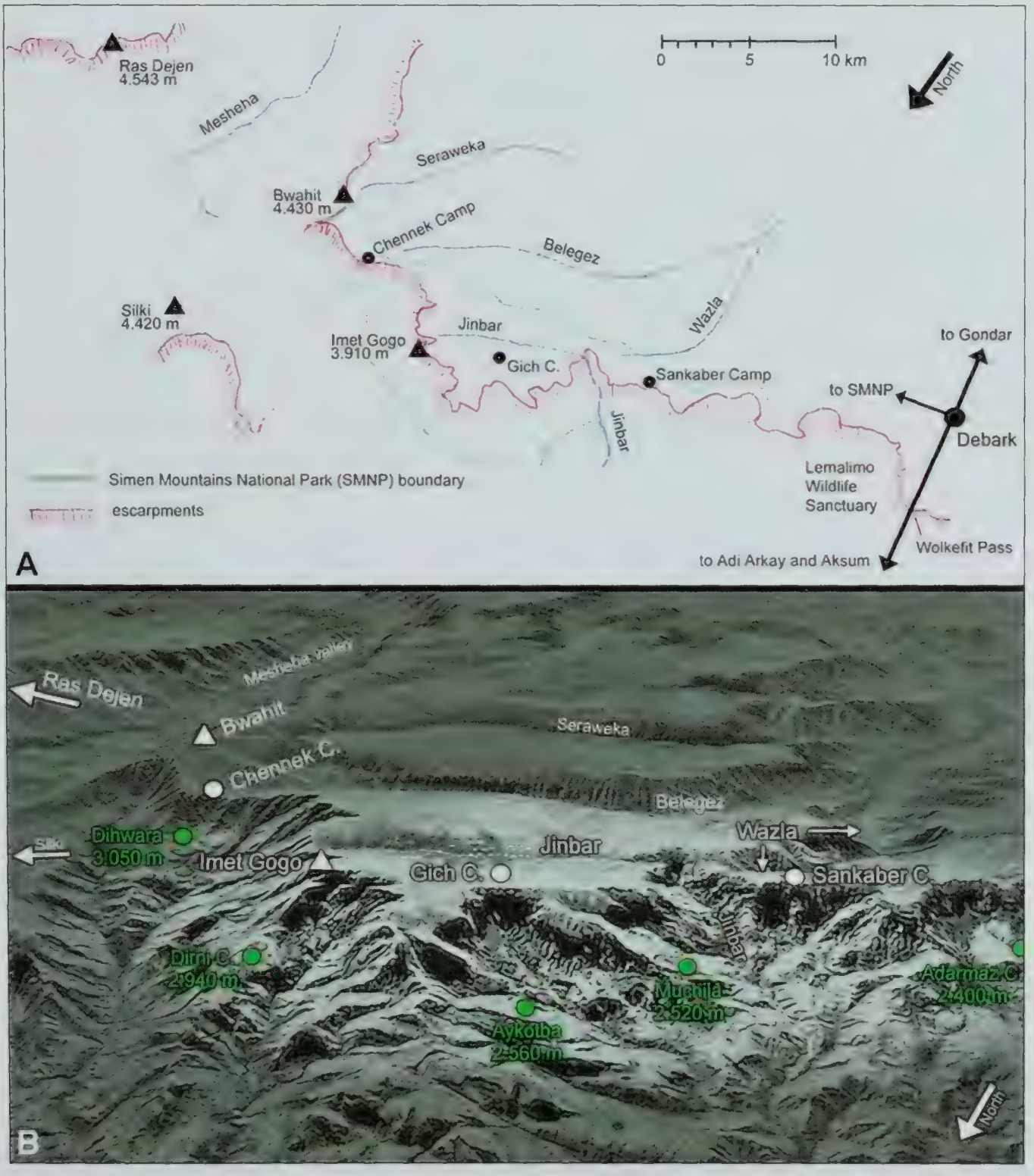


Fig. IP2. – The Simen area. – A, major escarpments, mountain peaks and rivers; the road from Debark to Sankaber and Chennek Camps is not shown (Gich Camp is not along this road; it can only be reached on foot or on horseback)(based on Nievergelt *1981: fig. 1). – B, three-dimensional view based on satellite images, the Simen Mountains National Park area highlighted; in green: selected Simen Lowlands localities (Camps, C., and villages) not shown in A.*

Especially in the North, the terrain drops sharply to form a steep and locally almost vertical escarpment which, in places, reaches 1,500 m in height and extends for about 50 km (ca. 35 km within the SMNP). The land below the escarpment consists of many smaller plateaux and undulating plains which are dissected by numerous river valleys and steep gorges. It is

generally well above 2,000 m a.s.l. and even reaches ca. 2,500 m or more in some parts. The valley bottoms of this area are often below 2,000 m, and the lowest altitude encountered on a multiple day hike ± parallel to the escarpment, is the valley of the Jinbar River (ca. 1,700 m a.s.l.). In the Botanical Part of this book, this area is referred to as Simen Lowlands (LL), to clearly distinguish it from the high plateaux of the Simen Uplands (UL) which are generally separated by 1,000 m or more in altitude.

See maps, fig. IP2 and B, and also fig. IP3 to understand the usage of the terms Simen Up- and Lowlands.

Part of the Simen Massif was established as a National Park by the Order Number 59 published in Negarit Gazeta 29(4): 6-8 in October 31, 1969. Nine years later, in 1978, it was inscribed as a World Heritage Site by the Committee of UNESCO's World Heritage Convention. The SMNP was mainly established to protect endangered and endemic mammal species, notably the Walia Ibex (*Capra ibex walie*; for further zoological information see chapter Wildlife in the Simen). Road construction and human population increase (coupled with an increase in cultivations) within the site represent considerable threats to the values of SMNP. As a result, selected animal species, like the Walia Ibex, have started to move out of the park. For this reason, the World Heritage Committee decided to inscribe the SMNP on the List of World Heritage in Danger in 1996. By 1999, it had not been removed from this list. During the past 20 years, various boundary changes have been proposed. There were plans to include Mt. Bwahit and its summit (a very import historical plant locality; see pages 22–24 for further details), to exclude some cultivated land, and suggestions to include Lemalimo Wildlife Sanctuary, which would be a sensible westward extension of the SMNP as it lies in the westernmost part of the Simen escarpment. As far as known, no definite steps have, however, been taken.

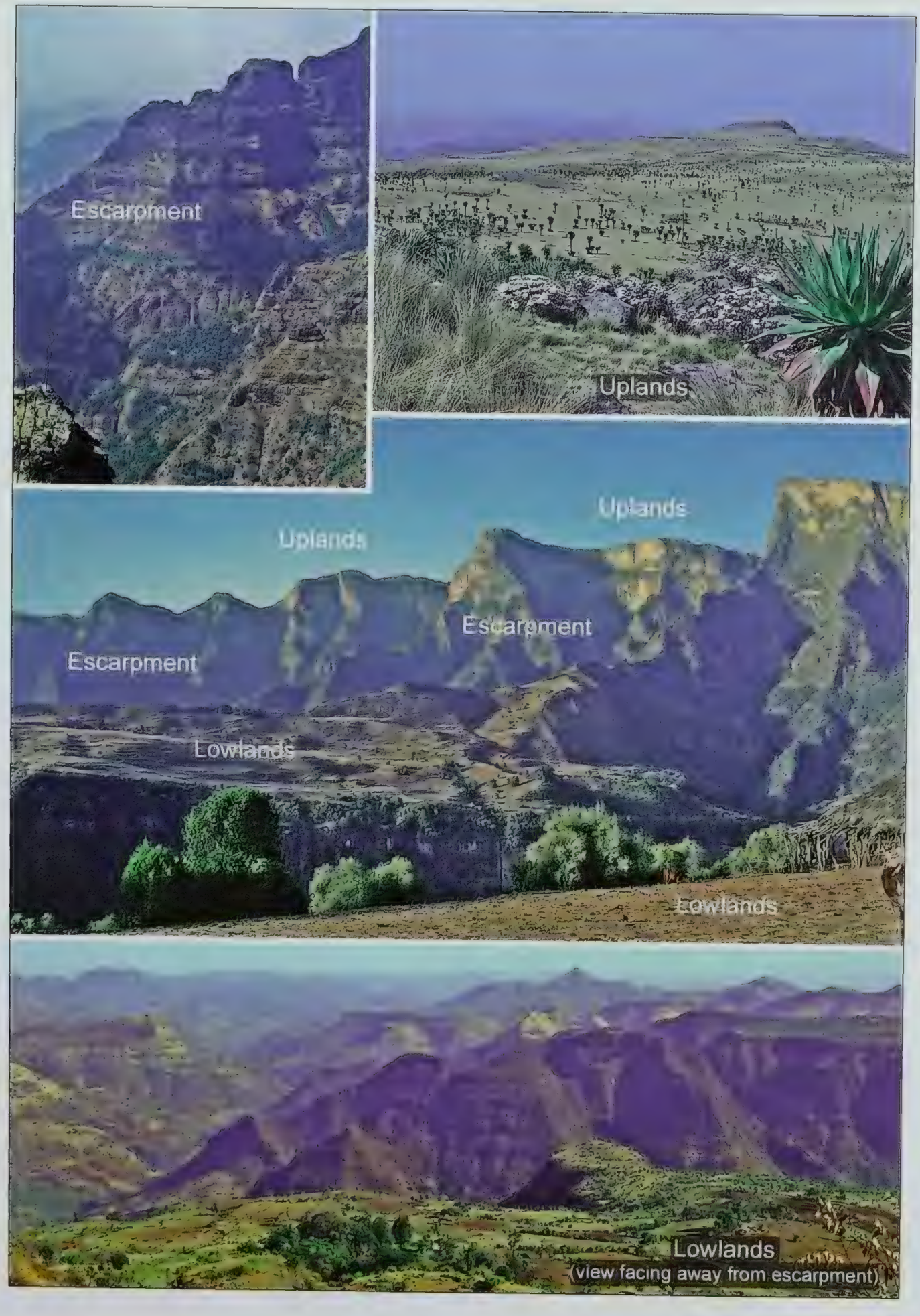
GEOLOGY

From the late Mesozoic Era to the early Tertiary, Ethiopia experienced a general uplift. After this event, vast quantities of basaltic lava was extruded and reached the surface. As thick series of lava flows (often also called Trappean basalt layers) which often reach several thousand meters in thickness, they covered large portions of the underlying Mesozoic rock. This was the birth of the Simen massif and is now generally believed to have taken place in the late Oligocene / early Miocene period of the Tertiary Era (i.e., some 25 million years ago) (Mohr 1983). Subsequently, extensive erosion of the basaltic layers over a long period of time led to the formation of the escarpments with its precipitous cliffs, the deep gorges and the jagged mountain peaks that make up the spectacular landscape of Simen Mountains as we know it today.

In Africa, the exceptional scenic beauty of the Simen is almost unique; only the Drakensberg range in southern Africa is faintly similar. The geological events that led to the attractive scenery of the Drakensberg range are basically comparable: as in the Simen, layers of basalt, often over 1,000 m in thickness, have been eroded away over the course of time to give rise to steep cliffs, deep river valleys. As the Drakensberg is much further away from the equator, snow is common during winter. Its plant composition, too, differs (*austro*-afroalpine vegetation on the highest parts).

>

Fig. IP3. – Simen Uplands, Escarpment and Lowlands. The picture in the centre, taken in the Lowlands (in the vicinity of Tiya village), shows a part of the magnificent Simen escarpment. – In the Simen context, "Lowlands" are only low in relation to the high-lying plateaux; the term refers to areas well above 2,000 m a.s.l. [see diagram, page 15]; only if one starts to move further away from the escarpment, altitudes begin to drop further. The Lowlands are dissected by many, in part, very steep river valleys (one of the deep gorges is visible in the centre picture; see also picture at the bottom). The lowest altitude encountered on a multiple day Lowlands hike, is the valley of the Jinbar River (ca. 1,700 m a.s.l.). – The "Uplands", on the other hand, are at an altitude of well above 3,000 m a.s.l.; they are a series of ± flat to sloping plateaux (see picture at the top, right side).


Escarpment
Uplands
Uplands
Uplands
Escarpment
Escarpment
Lowlands
Lowlands
Lowlands
(view facing away from escarpment)

CLIMATE

Because the Simen area includes a wide range of altitudes and aspects, local climatic conditions are quite variable. For this reason, the situation in the Simen Uplands and Lowlands will be described separately. In general, *detailed* climatic data on the Simen area are rather incompletely known; those available primarily refer to selected localities in the Simen Uplands.

Precipitation

The Simen area is characterized by a single main rainy season, which (at least in the Uplands) lasts from (April–)May to October(–November). Locally, there may also be a second wet season, with sparse rains in February and March.

The amount of annual rainfall is quite variable in the Simen area and the surrounding regions. The wettest areas receive over 1,500 mm annual precipitation, the driest only about a third of this amount. The wettest parts of the Simen area lie to the North in the Lowlands and along the northern escarpments. The driest areas are found on eastern escarpments along the Tekeze river; here rainfall starts later than in the Northwest. Rainfall also shows a distinct vertical zonation. A first maximum is recognizable at about 1,500 m above sea level; it can be explained by the condensation niveau of the Southwest monsoonal air masses. A second maximum is at about 3,500 m above sea level; it may be due to the escarpment at that altitude, with the rainfall advectively brought by trade winds over its edge.

Annual rainfall shows a dramatic topography-dependent decrease between Ras Dejen, the highest mountain of Ethiopia, and the low-lying Tekeze river valley (only some kilometers away and forming the southern to northeastern border of the Simen Massif); this decrease in precipitation also goes along with an increased annual variability in rainfall.

Snow is only rarely seen in the Simen and, if so, only at altitudes of 3,800 m or above. Snow usually stays for a few days only and does not form a permanent cover (the permanent snow line is estimated at 5,000 m above sea level, which is almost 500 m above Ethiopia's highest mountains). Localities where snow has be observed include Mt. Bwahit (4,430 m), the vicinity of Mt. Silki (at ca. 3,800 m) and the Ras Dejen area (at 4,200 m) and date mostly from November to February. The present authors noted snow in the summit area of Kiddis Yared (4,453 m) in May 1999.

Climate in the Uplands

At altitudes ranging from above 3,200 m to 4,500 m, the climate is characterized by northerly winds all year, an increase in cloud cover with altitude, a maximum of annual rainfall at about 3,500 m above sea level, frequent hailstorms with high erosivities, occasional snow in higher elevations, and frequent frost. It is typical of African high mountains in general and can be called afroalpine climate (see Hedberg 1964, Coe 1967, Lind & Morrison 1974, etc.). The climate in this altitudinal belt is unfavorable for most grains and pulses except barley, potatoes, and some vegetables.

While the (low) mean temperatures are quite stable throughout the year (at Gich Camp, 3,600 m, for example, they are between 7° and 8° C), the variations in diurnal temperatures are quite drastic (hence Hedberg's 1964 description of the afroalpine climate as "summer every day, winter every night").

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*Fig. IP4. – Appearance of the Simen area in the dry (A_1-C_1) and in the wet season (A_2-C_2). – A, view from the edge of the escarpment around Sankaber towards the Lowlands; in the dry season, the Lowlands area typically appears hazy (probably due to dust in the air). – B, Afroalpine grassland in the Uplands; the Giant Lobelias (*Lobelia rhynchopetalum*) remain green in the dry season; in contrast to the Lowlands, the sky is normally clear, blue, and cloudless in the dry season. – C, Diwhara village, Lowlands and escarpment as seen from the Chennek–Dihwara trail.*

A1
A2
B1
B2
C1
C2

At Gich Camp, the lowest temperature (recorded at night) was –2° C, the highest (recorded during the day) 18° C. In a five year period, night frosts (i.e. absolute minimum temperatures of below 0° C) were encountered from mid-September to mid-April (Hurni 1986). The impression of "summer every day" is heightened by the intense irradiation during the day (which is the result of a thin atmosphere) and – in the summer half-year – the near vertical position of the sun. This produces high surface temperatures and very different temperatures in the sun and in the shade.

Data for Gich Camp (based on an observation period of five years) suggest that the rainy season starts in the second half of March and stops at the end of November (Hurni 1986), but there seem to be year-to-year fluctuations. During an expedition in April/May 2001, the rainy season was delayed and the Uplands had received absolutely no rain by the second half of April. Rains seem to be heaviest in July and August. In the dry season (typically December to mid-March), there are either no rainfalls at all or only odd, short showers (amounting to < 10 mm of precipitation). Average annual rainfall at Gich Camp is about 1,500 mm; in years with heavy rains, annual precipitation may reach close to 1,600 mm, in years with lighter rains < 1,400 mm.

There are usually 5–10 hailstorms per year, occurring mainly in the marginal months (i. e. around the beginning and/or the end of the rainy season). In the rainy season, clouds and fog are common. They start developing in the escarpment area either from late morning onwards, or shortly before mid-day (see fig. IP5A). Rain most often starts at noon or in the afternoon.

During the rainy season the most common wind direction, especially of stronger winds, is East and Northeast; the rain is inclined at an average angle of about 75°. For this reason East-facing slopes receive more rain than West-facing slopes.

Climate in the Lowlands

At altitudes ranging from ca. 2,000 to 3,200 m, the climate is characterized by the (upwardly decreasing) influence of Southwest monsoons, convective rains, trade winds only in the dry season, less frequent hailstorms, no snow and rare frost. This altitudinal belt is favourable for most Ethiopian crops and pulses. Detailed temperature data appear to be mostly absent for the Simen Lowlands, but it seems safe to presume that daily minimum and maximum air temperatures are around 10° C higher than in the Uplands (provided general weather condition such as cloudiness, etc., in the Low- and Uplands are comparable).

During an expedition in April/May 2001, morning temperature values in the Lowlands ranged from 13,6° to 19,6° C (the differences partly also reflected the altitudes of the measuring points), and on every single day the maximum was well over 20° C, reaching even > 30° C on some days. An analysis of the data gathered during the expedition, moreover, yielded that the minimum temperatures recorded in the Lowlands zone were roughly in the same range as the maximum temperature values from the Uplands (Nagl 2002).

Vegetation in the wet and dry season; fires (fig. IP4–6)

The appearance of the Simen area is strikingly different in the dry and wet season: in the former, the general appearance is yellowish (except for evergreen forest patches in the

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Fig. IP5. – Climate in the Simen area. – A-B, in the rainy season, clouds over the Lowlands tend to move up the escarpment in the morning, eventually forming a dense cloud cover over the Uplands; heavy thunderstorms frequently develop in the second half of the day over the Uplands (A, view of escarpment from the Chennek–Dihwara trail; B, view of Adarmaz area). – C, heavy cloud cover and rain over the Lowlands (view from escarpment near Sankaber). – D-E, dry season; D, view of the escarpment from the Lowlands (Sugsug–Karnaja trail); E, view from Muchila Afaf towards the Lowlands, the distinctly cone-shaped hill with a patch of evergreen forest in front of it marks the location of Aykotba village.

A
B
C
D
E

Lowlands or *Erica* scrub or forest on the escarpment slopes and elsewhere), while in the wet season the entire area look lush green.

In the dry season, the extensive grassland areas of the Uplands present themselves in dead-looking, dried-up state, with green patches only along trickles of water, along streams, in *Carex monostachya* bogs, etc. The Giant Lobelia, *Lobelia rhynchopetalum*, however, seems to be unaffected by the drought and always shows healthy green leaves. Also in special habitats like shady, sheltered vertical cliffs, vegetation is mostly green. In the Lowlands, grass- and woodland, farm scrub, etc., too, have a mostly very dried-up ground/herb layer, with only the odd geophytes flowering or coming into flower. Many of the deciduous trees are leafless and sterile or sometimes either with fruits or flowers. In the forest patches, many shrubs, most of the epiphytes (herbs, mosses) and also numerous ground herbs show wilted leaves turning yellowish.

After the first rains, the grass soon starts to turn green again, and many herbs come into flower within a rather short period. In the Lowlands, deciduous trees produce new foliage (sometimes having flowered prior to leafing), and the species-rich afromontane forest patches now look quite spectacular as many trees show a dense cover of healthy-looking epiphytes.

Fires. Man-made fires are a common occurrence, especially in the Simen Lowlands. Grass-, bush- or woodland areas are burnt usually at the end of the dry/beginning of the wet season to promote grass growth (fodder for cattle!); forest patches are burnt to gain new areas for agriculture. Fires set in the vicinity of the steep escarpments are particularly dangerous, as the possibility of fires to escape upslope (and thus destroying larger areas of natural vegetation than intended) is very big. Fig. IP 6B is an example for this: the fire must have been set in the valley several hundred meters below the inaccessible rock towers whose sparse vegetation is now on fire. In the Uplands, burning – although also frequent – is usually done on a smaller scale (fig. IP 6A), at least in the SMNP area.

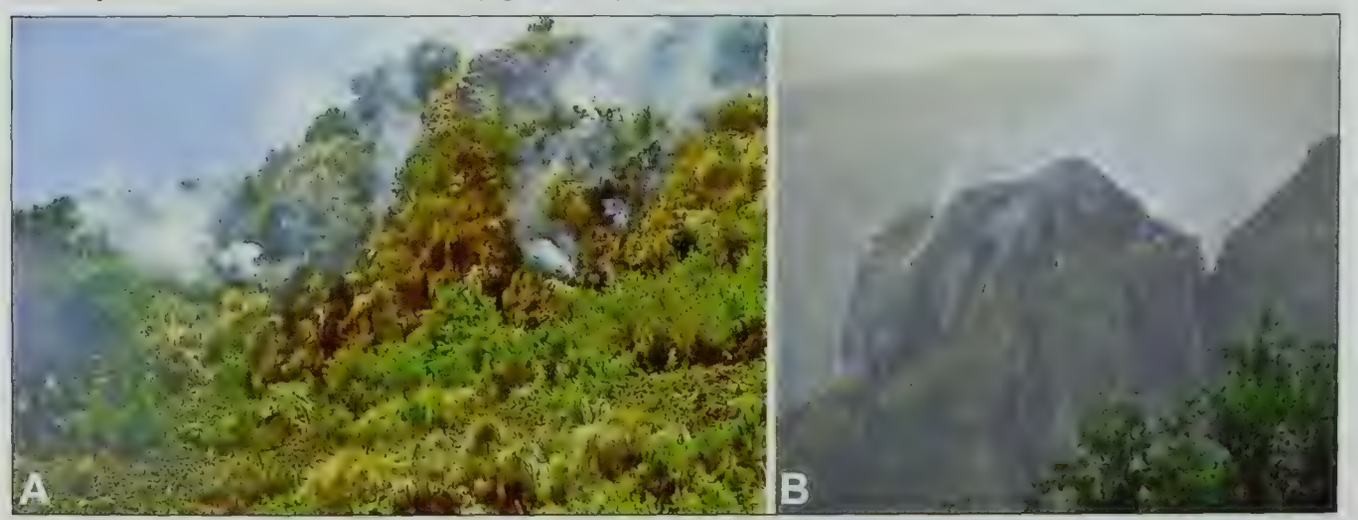

Fig. IP6. – Man-mad fires in the Simen. – A, in Erica *scrub (Uplands, below Gich Camp). – B, on an inaccessible rock tower covered by grasses and scrub; an example of an "escaped" fire which had started in cultivated areas further below (see text; Lowlands, around Tiya village, early evening).*

Those visiting the Simen out of botanical interest will find interesting plants both in the dry and in the wet season. There are some herbs, shrubs and trees in flower and/or in fruit in the dry season, but their total number – as compared to the wet season – will be quite small. On the other hand, camping out in the Low- and Uplands in dry season is – despite the cold weather conditions at higher altitudes – much more pleasant than in the rainy season. In the dry season, moreover, the skies are clear and blue in the Uplands, and the views of the escarpment from the Lowlands unimpeded by low clouds (over the Lowland areas facing

away from the escarpment, however, skies tend to be hazy – presumably due to the fine dust in the atmosphere) (see fig. IP4–5).

When planning a trip to the Simen in the dry or in the wet season, one should also take into consideration the annual fluctuations in the beginning and end of the rainy season which could be well over one month (see above).

VEGETATION TYPES

There are two major vegetation types in the Simen area: Afroalpine Vegetation (in the Uplands) and Afromontane Vegetation (in the Simen Lowlands). Ericaceous forest, scrub or bushland is ± transitional, occurring both on the escarpments and in the Uplands. Moreover, the lowest areas of the Lowlands (below 2,000 m; valley of the Jinbar river and its tributaries) contains wood- and bushland which, based on its species composition, shows affinities to woodland areas found in the Sudanian or Sudano-Zambezian Region.

SIMEN UPLANDS: Afroalpine grassland

Most of the Simen Uplands are grassy, undulating plains. With few exceptions, the only tall, tree-like plants are the magnificent Giant Lobelias, *Lobelia rhynchopetalum*. Although not universally present, they tend to be locally common, forming large populations often consisting of hundreds of individuals. Usually some of the plants will be in flower, exhibiting their several meters long candle-like inflorescences (cf., for example, fig. IP4B or 7A).

There are primarily two structural grassland types: "short-grass steppe" and "long-grass steppe" whose differentiation is not always clear-cut (there are areas where there is a mosaic of both types). In the first, the dense vegetation cover is only ca. 20–40 cm tall, in the second ca. 40–80 cm (provided the vegetation is in a natural state). They are made up of many different species of grasses; some of the most common and prominent are *Festuca abyssinica* and *F. macrophylla* and *Danthonia subulata.* In many parts of the Uplands, the grasslands are heavily grazed by domestic animals such as cows, horses, mules, donkeys, sheep and goats, resulting in a drastic reduction of the vegetation height (the "short-grass steppe" becomes lawn-like and less than 20 cm high; the "long-grass steppe" is reduced to small tufts of grasses only ca. 20–40 cm tall). Obviously, overgrazing is worst around villages but it was noticed that, especially in the dry season, shepherds often move their herds a long distance away from their domiciles, thus also seriously damaging the natural vegetation (including regeneration of Giant Lobelias) in these areas.

Although grasses are dominant, many other annual and perennial herbs as well as some dwarf shrubs occur. The presence of most of the herbs is only obvious in the wet season (when they are generally in flower). Especially richly represented are both annual and perennial clover species (*Trifolium* spp., Leguminosae-Papilionoideae).

The Simen Upland areas contain all five "typical" Afroalpine Life-Forms (as defined by Hedberg 1964), namely Giant Rosette Plants (*Lobelia rhynchopetalum*)*, Tussock Grasses (and Sedges) (e.g. *Festuca macrophylla*, Poaceae, or *Carex monostachya*, Cyperaceae), Acaulescent Rosette Plants (e.g. *Haplosciadum abyssinicum*, Apiaceae), Cushion Plants (e.g. *Swertia lugardae*, Gentianaceae), and Sclerophyllous (Dwarf)Shrubs (e.g. *Helichrysum citrispinum*, Compositae).

* One major difference between the afroalpine vegetation of the Simen Mountains (and all other Ethiopian high mountains, for that matter) and the tropical East African mountains (such as Mt. Kenya, Mt. Elgon, or Kilimanjaro) is that a second group of Giant Rosette Plants, namely the Giant Senecios (*Senecio* subgen. *Dendrosenecio*; Compositae), are absent; also shrubby Alchemillas (*Alchemilla* spp., Rosaceae), typical of tropical East African afroalpine habitats, do not extend into Ethiopia.

Trees in the Afroalpine zone. Except for small *Erica* trees and bushes which, in various places of the Uplands, occur in small to large populations in afroalpine grassland areas (forming an *Erica* – grassland mosaic; see Ericaceous Forest, Bushland and Scrub, below, for further notes), natural trees are sparse. Occasionally, small trees of *Hypericum revolutum* (Hypericaceae) are mixed in with the Ericas but are

never very common; in some areas (such as above Gich Camp) solitary, gnarled *Hypericum* trees have somehow managed to establish themselves in otherwise tree-less afroalpine grassland.

In and around some of the villages in the Uplands (especially Gich village, which lies within SMNP, and Argin village, just outside the Park), *Eucalyptus* trees (*E. globulus*, Myrtaceae) have been planted (for use as construction and fire wood).

Grasslands may look uniform from the distance but, after having a closer look, one can distinguish a number of **special habitats within the grassland areas**. Some of the more prominent of these are:

Carex monostaycha bogs. These permanently wet habitats occur on entirely flat or only slightly sloping ground and are distinguished by the large tufts of the sedge *Carex monostachya* (Cyperaceae). The ground between the sedges is covered by numerous moisture-loving perennial herbs such as *Ranunculus*, *Haplocarpha*, *Alchemilla* or *Trifolium* species. Not infrequently, scattered individuals of *Lobelia rhynchopetalum* are also mixed in.

In the dry season these bogs are (apart from seepage areas and narrow strips of vegetation along permanent watercourses – see below) the only "green" spots in the afroalpine grassland zone (cf. fig. IP 7B).

Afroalpine streams and other wet areas. There are both permanent and ephemeral watercourses, small water seepage areas as well as some small ponds in the Simen Uplands. The vegetation along these watercourses stays green all year round only if the water supply is not interrupted in the dry season; the vegetation along small, ephemeral streams, thus, has the same yellowish appearance as the surrounding grasslands, and the plants are dried up.

Plants of permanently wet seepage areas and along streams flowing all year round include *Cotula abyssinica*, various thistles in the wide sense (*Cirsium*, *Carduus* spp.), some Apiaceae as well as the perennial herbs that also occur in *Carex monostaycha* bogs (see above). The most typical plants of the ponds, which tend to dry up almost completely at the height of the dry season include *Crassula granvikii* (Crassulaceae) and *Limosella major* ("*L. aquatica*"; Scrophulariaceae).

Vegetation in rocky areas. In many places, small, scattered rocks occur within the Simen Uplands grassland areas ("rocky grassland"; cf. fig. IP7C). Frequently, various cushion-forming perennial herbs and dwarf shrubs (notably *Helichrysum*) nestle around the base of the rocks, presumably taking advantage of the slightly increased moisture supply due to run-off water from the rocks. Otherwise, the vegetation is not strikingly different from surrounding grasslands.

Large rocky outcrops in grassland, ranging in height from about one to several meters and in length from several to 20–30 meters or more, are more interesting in their species composition. They harbour basically two types of plants: (a) sun-loving and drought-resistant perennial herbs and dwarf shrubs which grow exposed in cracks of rocks, and (b) shade- and moisture-loving plants which prefer shady, sheltered areas at the base of the outcrops. Typical plants of category (a) include *Crassula schimperi* and *Umbilicus botryoides* (both Crassulaceae), *Verbascum arbusculum* (the only shrubby and spiny member of this genus in the

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*Fig. IP7. – Vegetation of the Simen Uplands and Escarpments. – A, Afroalpine grassland; Giant Lobelias (*Lobelia rhynchopetalum*) are not universally present and their density of in the Uplands varies greatly (view from above Gich Camp). – B-C, special habitats in the Uplands; B,* Carex monostachya *bog, one of the few "green" areas in the dry season; C, rocky outcrops in Afroalpine grassland. – D, escarpment with dense* Erica *forest/scrub (view from Muchila Afaf area toward the Sugsug area). – E, Afroalpine grassland and scattered* Erica *scrub in the Upland area; the escarpment in the foreground is grown over with grasses and herbs but is much too steep to support woody vegetation (view from Imet Gogo towards Shayno Sefer and escarpment).*

A
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Simen), *Hesperantha petitiana* (Iridaceae) and various grasses; examples of category (b) are *Hypagophytum abyssinicum* (Crassulaceae), *Saxifraga hederifolia* (Saxifragaceae) and various *Trifolium* species.

Even more extensive rocky outcrops in grassland, as well as many parts of the Simen escarpment often have large, almost vertical cliff-faces with dry, sun-exposed as well as moist to wet and shady microhabitats. Although they obviously are no longer part of the afroalpine grassland, a brief description of their vegetation is appended here:

Vegetation of almost vertical cliffs (cf. fig. IP15A). Sun-exposed, open areas of the cliffs often have a sparse vegetation cover; various grasses such as *Festuca* spp. and *Poa simensis* are often the only plants seen; spectacular dicots growing in such places include *Aeonium leucoblepharum* (Crassulaceae) and *Dianthus longiglumis* (Caryophyllaceae). Sheltered, shady, moist to wet areas of the cliffs, on the other hand, harbour a number of highly interesting plants, amongst them *Rosularia semiensis* (Crassulaceae), a Simen endemic, and *Primula verticillata* subsp. *simensis* (Primulaceae).

SIMEN ESCARPMENT and UPLANDS: Ericaceous forest, bushland or scrub

This vegetation type is most prominent on the escarpments, especially where the slopes are not too steep (extremely steep slopes do not support woody vegetation; compare fig. IP 7D and E). Here, it forms a ± distinct Ericaceous Belt (which, although at a different altitudinal ranges, also occurs on some tropical East African mountains; cf. Hedberg 1951). There are, however, also small to fairly large stands of *Erica* in the Uplands, i.e., in the strictly afroalpine region of the Simen (they are, therefore, often also referred to as Afroalpine Shrubland in literature, e.g. White 1983). Uplands *Erica* populations are most commonly found on sloped ground.

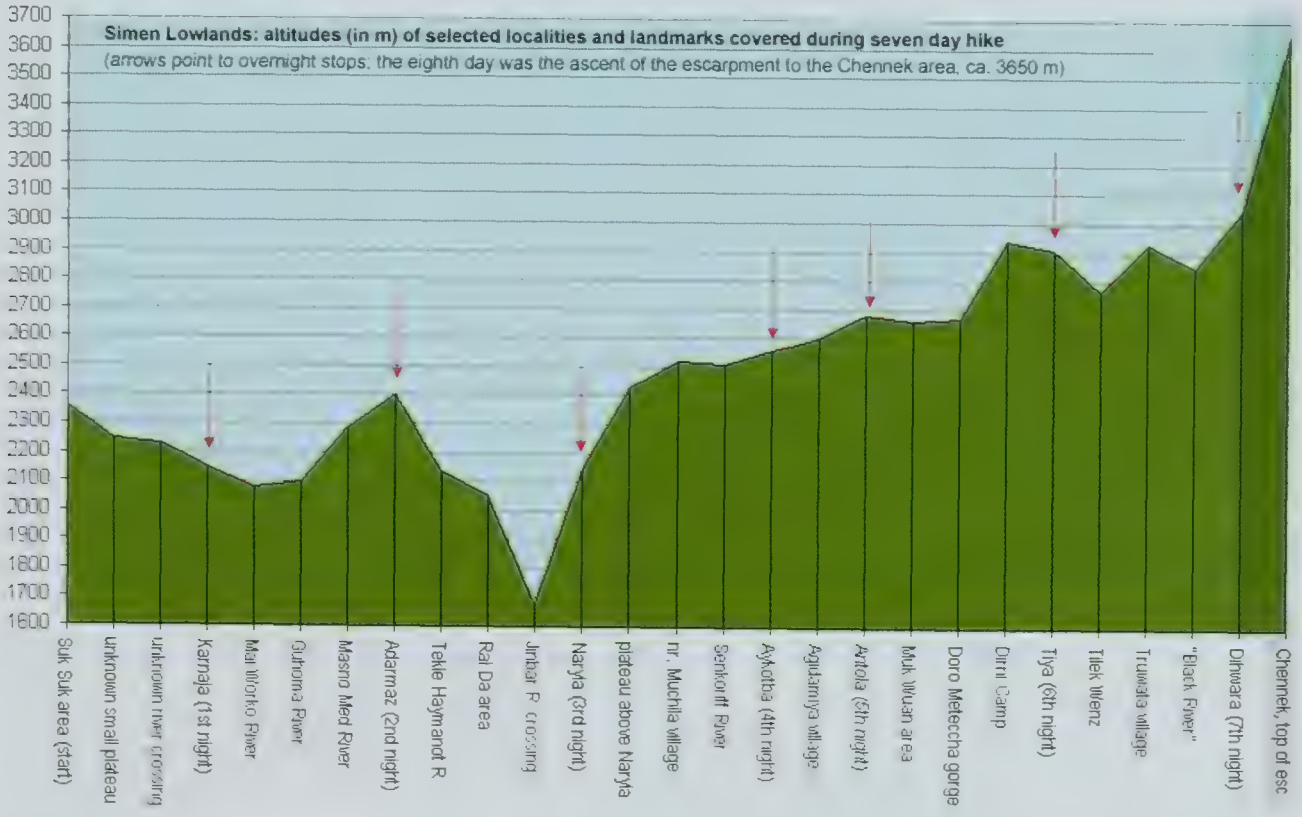
With *Erica* often being the only woody member, it is one of most species-poor vegetation types in the Simen. Two species, *Erica arborea* and *E. trimera*, are present, with the former probably being the more common on the Uplands. They are similar in their appearance and cannot reliably be distinguished from a distance; a close-up examination is needed to distinguish them. Locally, *Hypericum revolutum* may be mixed in as the only other tree species. In many Uplands populations, the herbaceous cover, primarily consisting of afroalpine grassland species, is mostly very poor due to overgrazing.

Ericaceous vegetation is only undisturbed and natural in the inaccessible parts of the escarpments; here, *Erica* can become tree-like, sometimes reaching heights of about 10 m or more. Such proper *Erica* forests are virtually absent in the Uplands because of extensive human disturbance. Often being the only woody vegetation, branches and trunks are regularly removed for fuel. By doing so, the plant's original tree habit is converted to that of a multi-stemmed shrub (after removal of trunks, plants start sprouting from the base). (Man-made) fire can have the same effect on growth form. The terms *Erica* Bushland or *Erica* Scrub are then preferable to *Erica* Forest.

SIMEN LOWLANDS: Afromontane forests

As the Simen Lowlands are quite densely populated, most of the original afromontane forests have been cleared for fuel and cultivation. The remaining forest patches are scattered along the base of the escarpment and are primarily confined to difficult-to-access gullies and steep slopes that are unsuitable as arable land, or where extraction of timber and fire wood is impracticable. Forest trees are also left behind in both Christian and Muslim graveyard areas; well known, interesting and quite large "graveyard forests" are in the vicinity of Nariya, Antola and Diwhara villages. The largest existing afromontane forest area within SMNP, estimated to cover an area of well over one square kilometer, is in the vicinity of Adarmaz Camp (Adarmaz forest; fig. IP8A). Many of the remaining forests, both in- and outside the SMNP boundary, are however largely reduced to small to very small patches, sometimes only covering an area of several hundred square meters.

To get a good overview of the afromontane forest patches along the Simen main escarpment, one has to set aside eight days, seven of which are for hiking in the Lowlands. The multi-day hike is strenuous and – although the well-marked trails (which are primarily used by the locals) generally follow contours – there are many steep to very steep parts. The diagram below (from a field trip in 2001; Puff 2002) gives an overview of the altitudinal ranges that need to be covered during the entire hike. – For more details and abbreviated Lowland trips see chapter Practical Tips.



Another interesting afromontane forest within SMNP is the Wazla Wenz forest (fig. IP8G). It is not located along the base of the main (Northern) Simen escarpment but in the valley of the Wazla river (= Wazla Wenz) which is just South of Sankaber Camp [see maps, fig. IP2A-B]. It is easily accessible by following the Wazla river from its source downward. For those not having time for a multi-day hike in the Simen Lowlands, it is the only opportunity to see afromontane forest. Starting from Sankaber Camp, the core part of the forest can be reached in about four hours of hiking.

Two quite distinct types of afromontane forest can be distinguished in the Simen Lowlands, namely a "wet" and a "dry" type. They will be dealt with separately:

Wet afromontane forests and forest patches (fig. IP8) are often found on the shadier North- or Northwest-facing slopes, in valley situations and in steep and shady gullies. They are generally rich in woody species. Characteristic tree species, often up to ca. 20(-25) m tall, include *Prunus africana*, *Apodytes dimidiata* var. *acutifolia*, *Schefflera abyssinica*, *Olea capensis* subsp. *macrocarpa* (syn. *O. hochstetteri*), *Pittosporum viridiflorum* and *Brucea antidysenterica*. The smaller tree and shrub layer is well developed, and several woody climbers such as *Embelia schimperi* or *Helinus mystacinus* are typically present. The herb layer tends to be poorly developed (possibly because of overgrazing by livestock). Numerous mosses, lichens and ferns grow on the boles of the trees; epiphytic angiosperms are represented by species like *Peperomia abyssinica* and various orchids.

Below is a brief description of a few of the forests and forest patches along the Northern Simen escarpment:

Adarmaz forest (fig. IP8A-C). Located in a broad valley, just North of Adarmaz camp, the forest extends from 2,400 m to 2,700 m. Most of the forest is wet, species-rich afromontane

forest and all species mentioned above are present; at the fringes, on steep, sun-exposed rocky slopes of the escarpment (South-southeast of Adarmaz Camp) it changes into dry, species-poor forest (see further below for details). At its upper altitudinal limit *Dombeya torrida* subsp. *torrrida* (Sterculiaceae) is the most common tree. Apart from the shrub and small tree and herb layers, which show signs of grazing my domestic animals, the forest seems to the in a ± good condition. The canopy, in some places ± closed and continuous, in others discontinuous, is at about 20–25 m, below it there is a layer of trees to ca. 10–15 m tall; the shrub and small tree layer reaches a height of ca. 3–7 m.

Forest in the valley of the Adarmaz Tekle Haymanot River (fig. IP8F). Located some distance Northeast of Adarmaz Camp, this forest lies at lower altitude (the path crosses the river at ca. 2,150 m). It has a strikingly different species composition and is dominated by the legume trees *Albizia schimperiana* and *Millettia ferruginea* subsp. *ferruginea*. Both are large trees to ca. 25 m tall; the former is easily recognized by its ± flat-topped, loose crown. The forest also contains numerous to ca. 20 m tall specimens of *Croton macrostachyus* (Euphorbiaceae), a species frequently seen elsewhere in the Simen Lowlands but then generally much smaller (less than 10 m) and in disturbed areas. Many large individuals of the palm *Phoenix reclinata* are present at the edge of the forest [although the species is also found in a variety of other habitats such as in woodland and wooded grassland, always near watercourses, in ravines, and on steep slopes of the escarpment (especially East of the Sug Sug area) where they form large populations ("palm groves")].

Muchila-Neznazit forest (fig. IP8D-E). This extensive forest patch lies on the trail from Muchila village to Aykotba village and is in mostly very rugged and difficult-to-access steep terrain. Along the main Simen escarpment, it appears to be the wettest patch of forest, with most tree trunks densely packed with epiphytic ferns and mosses; also various epiphytic orchids are present. Gullies are dominated by *Schefflera abyssinica*, *Dombeya torrida* and *Hagenia abyssinica*; especially the last-mentioned forms large populations in this area. The forest is one of the few areas in the Simen Lowlands where the afromontane Giant Lobelia, *Lobelia giberroa*, is locally common. Also two Rubiaceae shrubs, *Psychotria orophila* and *Galiniera saxifraga*, which are otherwise uncommon in the Simen, can be seen in this forest.

Graveyard forests generally look rather impressive from the distance, but a closer examination shows that the shrub and small tree layer has largely been removed and that the herb layer is very much disturbed. The graveyard forest at Nariya village is dominated by impressive, tall trees of *Albizia schimperiana*, while at Antola village it contains some obviously very old tree junipers (*Juniperus procera*) – possibly the oldest and largest trees of the species found in the entire Simen Lowlands.

Dry afromontane forests and forest patches (fig. IP9) are typically located on dry, often very steep slopes which frequently face South or Southeast. They generally are rather poor in species and in some forests of this type, *Olea europaea* subsp. *cuspidata* (syn. *O. africana*) is the only dominant tree. In other forest patches, *Olea* and *Euphorbia ampliphylla* are co-dominant. The tree juniper, *Juniperus procera* (Cupressaceae), elsewhere in the northern highlands of Ethiopia often associated with Olea (*Juniperus–Olea* dry type of afromontane forest), is rather uncommon in the Simen Lowlands. Small stands were observed only between Antola, Tiya and Truwata villages.

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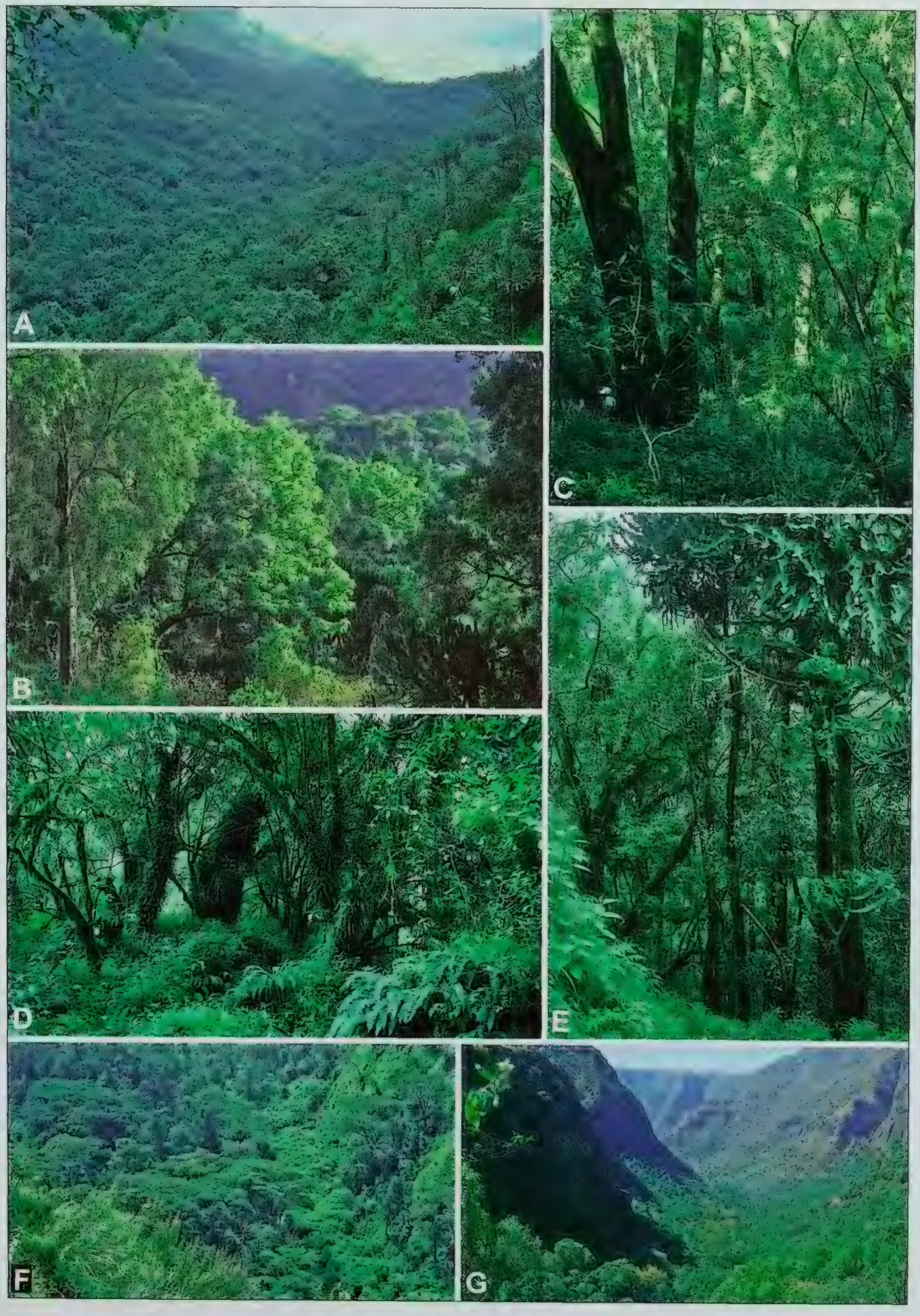
Fig. IP8. – Vegetation of the Simen Lowlands: wet, species-rich afromontane forests. – A-C, Adarmaz forest; A, view of the forest from the trail leading up the escarpment; B, forest profile; C, inside the forest. – D-E, "mossy" forest (Muchila-Neznazit forest), note moss-, lichen- and fern-covered trunks (prominent on the right side on E: trunks of Euphorbia ampliphylla*). – F,* Albizia*-dominated forest (flat-topped crowns) in the valley of the Adarmaz Tekle Haymanot river. – G, forest in the Wazla Wenz valley; as this is easily accessible from Sankaber Camp, its visit is strongly recommended for those not having enough time for a multi-day hike in the Lowlands, along the main Simen escarpment.*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Undergrowth in these dry forest patches is generally rather sparse. Often seen shrubs include *Dodonaea angustifolia* (Sapindaceae), *Osyris quadripartita* (Santalaceae), *Hypericum quartinianum* (Hypericaceae) and *Rosa abyssinica* (Rosaceae). Rare, and only seen in the Wolkefit Pass area and around Dirni Camp, is *Protea gaguedi* (Proteaceae). One of the most frequently see climbers is *Asparagus africanus* (Asparagaceae). The herb layer, in general, is much disturbed by overgrazing and also poor in species.

SIMEN LOWLANDS: Unusual habitats in the afromontane zone

Two habitats within Lemalimo Wildlife Sanctuary, both located along the road leading down the escarpment to the Lowlands (Wolkefit Pass) or in its vicinity, are noteworthy.

One is a pond with a large swampy area around its margin which lies on a hidden, flat plateau located some hundred meters West of the road. The swamp is bordered by nice stand of tall willows (*Salix mucronata*). Several species of *Juncus* (Juncaceae) and *Carex* (Cyperaceae), as well as *Epilobium hirsutum* (Onagraceae) and *Ranunculus* species are common there.

The second unusual habitat, directly along the escarpment road and at an altitude of 2,550 to 2,600 m, represents a pocket of afroalpine vegetation in an afromontane environment. It is a permanently wet, West-facing, shady small area of very steep slopes with several almost vertical cliffs and rock overhangs. It is presumably the microclimatic situation (unusually cool conditions, possibly enhanced by cold air drainage at night) which makes it possible for plants like *Primula verticillata* subsp. *simensis*, *Bartsia decurva* (Scrophulariaeae) and *Swertia kilimandscharica* (Gentianaceae) to establish themselves at altitudes that are much lower than is typical for them.

SIMEN LOWLANDS: Wood- and bushland

Wood- and bushland (or remnants thereof) occur at relatively low altitudes only (i.e. ca. 2,500 m and below; rarely slightly higher). Wood- and bushland often grades into strongly human-influenced farmbush and -scrub; a clear distinction is not always possible. In several localities, there is a mosaic of wood- or bushland and (secondary?) grassland; many other areas could be referred to as wooded grassland, with widely spaced trees in (secondary?) grassland (see also Disturbed and Secondary Vegetation, further below). The majority of woody elements of this vegetation type are deciduous and leafless in the dry season; some flower before the new leaves are produced.

In the lowermost localities of the Simen Lowland trails (along the Jinbar tributaries and in the Jinbar valley; below 2,000 m), the composition of the wood- and bushland changes, as elements which are no longer strictly afromontane start to occur. See further below for a brief description.

Afromontane wood- and bushland above 2,000 m. The most common type of woodland seen in the Lowlands is dominated by *Acacia abyssinica*. Some patches, often on slopes [such as in the Sug Sug (or Suksuk) area], are in a seemingly ± natural condition, but in the majority of *A. abyssinica* woodland locations the undergrowth is heavily damaged, primarily because of overgrazing. In some agriculturally used areas, the *Acacia* trees are left standing in and at the margins of fields (see fig. IP10E). Two more *Acacia* species, neither as abundant as *A. abyssinica*, are also present in the Lowlands. Additional typical and common components of Lowlands wood- and bushland and wooded grassland include the trees *Erythrina abyssinica* (Leguminosae), *Stereospermum kunthianum* (Bignoniaceae) and *Gardenia ternifolia* subsp. *jovis-tonantis* (Rubiaceae). Other noteworthy woody plants in this vegetation type are the Araliaceae *Cussonia arborea* and *Polyscias farinosa*, *Lannea schimperi* (Anacardiaceae) and *Hymenodictyon floribundum* (Rubiaceae); all of these are uncommon to ± rare. Shrubs include *Clerodendrum myricoides* (Lamiaceae), *Acanthus sennii* (Acanthaceae) and *Vernonia* spp. Climbers are represented by several Vitaceae (*Rhoicissus*, *Cissus*, *Cyphostemma*), *Dioscorea* (Dioscoreaceae), *Momordica foetida*

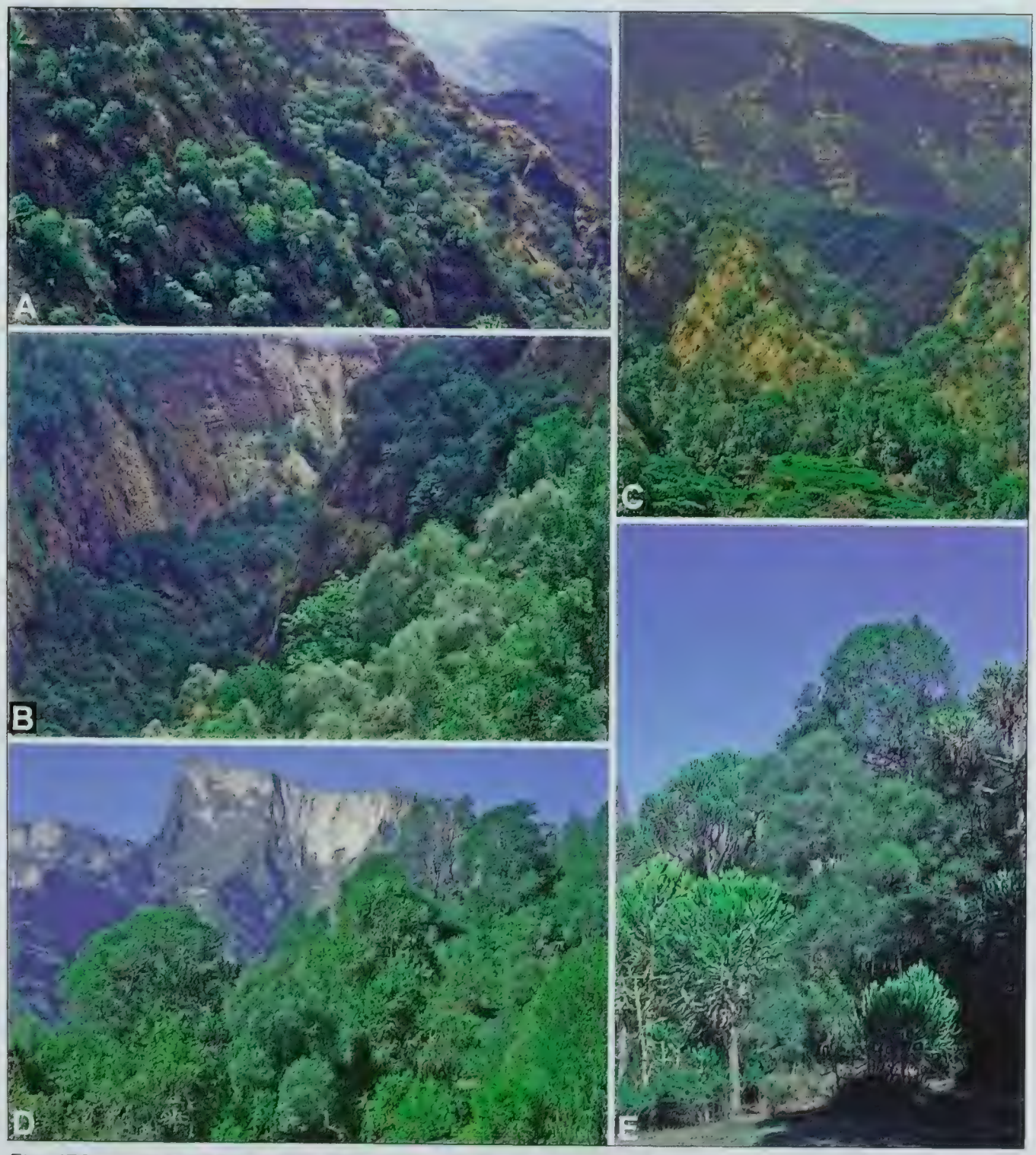

Fig. IP9. – Vegetation of the Simen Lowlands: dry, species-poor afromontane forests and forest patches. – A-C, Olea*-dominated forests; A, Wolkefit pass area (odd trees with fresh green leaves:* Schefflera abyssinica*); B, between Muchila and Aykotba villages; C, to the Northeast of Adarmaz Camp. – D-E,* Olea*-dominated forests with a few* Juniperus procera *trees and* Euphorbia ampliphylla *(E), both from around Tiya village.*

(Cucurbitaceae) and many other species. On rocky slopes, the leaf-succulent *Aloe macrocarpa* (Aloaceae) is conspicuous, especially when in flower. The herbaceous undergrowth is mostly overgrazed and poor in non-grass species but some plants such as the creeping to mat-forming perennial herb *Oldenlandia monanthos* (Rubiaceae) or various geophytic monocots (particularly common: *Merendera schimperiana*, Colchiaceae) resist trampling or are not eaten by domestic livestock.

Wood- and bushland below 2,000 m (valley of the Jinar river and its tributaries). The vegetation encountered at these low altitudes contains many plants not seen anywhere else in the Simen Lowlands. Several of them are Sudano-Zambezian or Sudanian elements. Most of the woody species are deciduous. It was observed on three trips to the valley of the Jinar river and its tributaries over a period of several years, that the natural vegetation is systematically being destroyed (both within and outside the SMNP boundary). The size of the cleared areas had drastically increased every year so that now only few patches of natural vegetation, mostly on very steep slopes unsuitable for cultivation, remain. Unless strict measures are undertaken to protect this vegetation, unique within the Simen area, it will soon disappear completely.

Woody plants only recorded from this region include the Combretaceae *Combretum molle* and *Terminalia schimperiana*, *Dichrostachys cinerea* (Leguminosae), *Grewia tembensis* (Tiliaceae), *Sterculia setigera* (Sterculiaceae) and *Steganotaenia araliacea* (Apiaceae). The latter two are stem-succulents and typical components of Sudanian or Sudano-Zambezian woodlands, respectively. Both are generally widespread but they extend to the Simen area only in the low-lying valley of the Jinbar river and its tributaries.

SIMEN LOWLANDS: Disturbed and secondary vegetation (fig. IP10)

The steadily growing population in the Lowlands and their need to grow food for survival and their increased demand for fire and construction wood have drastically reduced areas of natural vegetation (see also chapter People in the Simen). In total, it is estimated that less than about 10 % of the vegetation along the base of the main (Northern) Simen escarpments is ± undisturbed. In land used for agriculture, the original vegetation is removed completely or the odd solitary trees are left behind for one reason or another, either at the margin of or in the middle of the fields (cf., for example, fig. IP10F) (see below for more details). Extraction of woody plants from forests and woodlands resulted in the formation of open farmbush or -scrub, with areas of secondary grassland in between. Complete removal of trees and shrubs leaves behind a secondary grassland. Both farmland and secondary grassland are often burnt towards the end of the dry season to promote new growth at the beginning of the next rainy season.

Farmland and secondary scrub (farmbush- and scrub) is characterized by relatively few dominant shrub or small tree species. They are left untouched by domestic animals because they are unpalatable, thorny or poisonous. Common woody plants of this formation include the thorny *Carissa edulis* (Apocynaceae), *Capparis tomentosa* (Capparaceae) and *Maytenus arbutifolia* (Celastraceae), the prickly *Pterolobium stellatum* (Leguminosae), *Clutia abyssinica* (Euphorbiaceae), or *Buddleia polystachya* (Loganiaceae). Some of these eventually also take over fields that have been abandoned for several years. Recently abandoned fields are first invaded by fast growing weeds, namely by indigenous *Bidens* spp. (Compositae) and *Solanum marginatum* (Solanaceae) and the exotic *Argemone mexicana* (Papaveraceae). The subshrubby to shrubby *Acanthus sennii* (Acanthaceae) is often found at the edge of fields.

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Fig. IP10. – Vegetation of the Simen Lowlands: disturbed and secondary vegetation (A-C, dry season; D-F, wet season). – A, view of the Lowlands and the escarpment from the Karnaja area; except for a few trees, most of the woody vegetation has been removed; note the many fields in the less steep parts. – B, view facing away from the escarpment (around Antola village); few solitary trees remain, most flat to moderately steep areas have been transformed to fields. – C, area opposite Nariya village with solitary trees between fields and secondary scrub; forest only remains in an apparently ± inaccessible gully. – D, slopes covered by secondary scrub (near China village). – E, Acacia abyssinica *trees left standing in between fields (between Antola and Dirni villages). – F, view towards Muchila village (far distance); except for a small inaccessible area at the edge of the deep gorge in mid-distance, the natural vegetation has been removed.*

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Solitary, large trees in areas of secondary vegetation and in or at the edge of agricultural land. Such trees, once components of extensive, closed afromontane forests are scattered over the entire populated Simen Lowland area. They were left behind for various reasons: The tree's wood may not be of any value (e.g. *Ficus* spp., Moraceae) or the trees may simply be too hard to fell (e.g. *Apodytes dimidiata*, Icacinaceae). The trees are left growing because of their future special use (e.g. *Prunus africana*, Rosaceae, whose hard wood is used to make ploughs), or they are merely used as shade trees (e.g. *Acacia abyssinica*).

Other, frequently seen solitary trees in farmland, etc., include *Ekebergia capensis* (Meliaceae), *Schrebera alata* (Oleaceae), *Syzygium guineense* (Myrtaceae), *Bersama abyssinica* subsp. *abyssinica* (Melianthaceae), *Olea europaea* subsp. *cuspidata* (syn. *O. africana*; Oleaceae) or, only very locally, *Juniperus procera* (Cupressaceae).

THE SIMEN AS HISTORICAL PLANT COLLECTING LOCALITY

The importance of the Simen as a historical plant collecting locality is primarily due to the efforts of **Wilhelm Georg Schimper** (1804–1878) who, according to Gillett (1972), probably collected more type specimens of Tropical African Plants than any other botanist. Information on his life and activities in Ethiopia are given below. There were other early collectors with botanical and zoological interests who visited the Simen (e. g. Rüppell or Steudner, just to name two), but none of these spent such a long time in the mountains as Schimper.

Schimper's life and activities in Ethiopia

W.G. Schimper was a German born in a small village near Nuremberg (Nürnberg). After an adventurous youth, he reached Ethiopia in early 1837. After landing at the port of Massawa (now Eritrea) he continued to the Ethiopian highlands and soon won the confidence of Ras Ubie (or Ras Wube), King of Tigray. In 1843, he got married to an Ethiopian princess (the daughter of Ras Ubie); the marriage produced three children. For a time, he served as governor of the province Antitscho. Schimper's privileged position, however, ended when civil war broke out. Ras Ubie was defeated in 1855 and Tewodros (Theodoros) II became the new king. The Schimper family and numerous other Europeans became directly involved in a political dispute between Ethiopia and Great Britain. In 1863, they were taken hostage and imprisoned, to be freed again by a British military expedition. In 1878, Schimper died from an epidemic disease (see Cufodontis 1951 for a fuller account of Schimper's life).

Schimper traveled extensively in northern Ethiopia and visited the Simen Mountains and neighboring areas several times between 1838 and 1863 (data from Gillett 1972):

- June to August 1838
- October to December 1850
- December 1855 (possibly)
- January to May 1840
- August 1852, coming from Agau *
- in 1863, on his way to and from Begemder **

* Agau is the wide drainage basin of the upper Tekezze River, located Southeast of the Simen

** Begemder is the uplands region East of Lake Tana. As Schimper lived in Adua (Tigray), he had to pass by the Simen on his way to Begemder.

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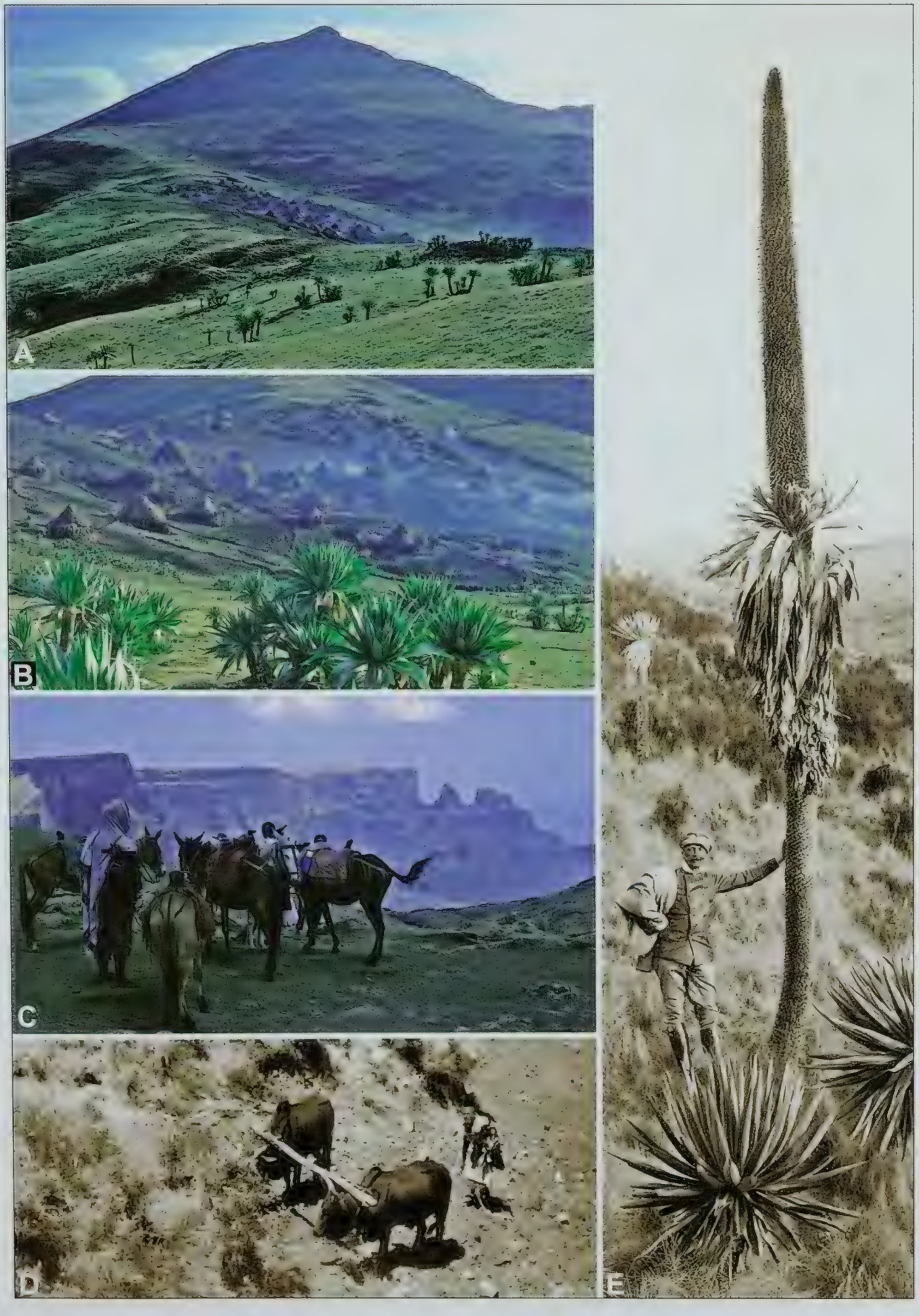
Fig. IP11. – The Simen as a historical plant collection locality. – A, Mt. Silki; many Afroalpine plants were for the first time collected on this mountain, primarily by W.G. Schimper *who visited the Simen several times between 1838 and 1863. – B, Arkwazye village at the base on Mt. Silki (also visible in A); a comparison with pictures from the 1930's, taken by members of an Italian expedition, shows that the settlement has hardly changed since then. – C, Mt. Bwahit (summit area; view towards the Simen main escarpment), also many times cited as the type locality of Afroalpine species. – D, plowing in the Uplands in the 1930's (photo from* Pichi-Sermolli *1940). – E, Felix Rosen standing next to a flowering Giant Lobelia (*Lobelia rhynchopetalum*) (photo taken in April 1905); the German botanist took back samples of the plant and was the first to study its anatomy (*Rosen *1909, 1911).*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Schimper collected very many botanical specimens, but there were severe losses. His possessions in Ethiopia, including plants and manuscripts, were looted and destroyed during the civil war in 1855 (see above). Many of his collections that had been sent to Europe were destroyed in the bombardement of Strasbourg in 1870; the first set of collections (which alone bore his careful and often copious field notes in full) was, with few exceptions, destroyed in the bombing of Berlin in 1944. Still, there is a large number of duplicates of his specimens in several European herbaria.

His collections are "difficult" for several reasons: Names of regions or settlements given on his labels are often no longer in use and are frequently impossible to trace. Moreover, one and the same name is often spelt differently (depending on the mother tongue of the local person using it). Examples in place are Mt. Bwahit and Mt. Silki (see fig. IP11A,C) which, on herbarium labels, show up as "Buahit", "Buait" or "Bachit," or as "Selki", "Selke" or "Selchi," respectively. Moreover, institutions receiving and distributing Schimper's specimens in Europe often placed on their labels the date, or year, of reception or distribution rather than the original collecting date (Gillett 1972).

Type collections from the Simen

According to our present state of knowledge, the number of (mostly) afromontane and -alpine taxa of flowering plants whose type specimens originate from the Simen region is about 250 (this number, however, also includes types of synonyms); the vast majority of these were collected by W.G. Schimper. This is approximately 45 % of the ca. 550 taxa currently recorded for the entire Simen area. Type collections of a large number of Simen and Ethiopian endemics were made by Schimper; see also under Endemism, next chapter.

BIO- AND PLANT DIVERSITY; PHYTOGEOGRAPHICAL ASPECTS; ENDEMISM

The Simen Mountain's high biodiversity is due to a combination of several factors: The mountain ecosystems cover a wide altitudinal range (from below 2,000 m to over 4,500 m a.s.l); its topography with gorges, crests, precipices, rocks and flat areas results in a rich mosaic pattern of different habitats, which promotes species richness and diversity; (micro)climatic differences, too, contribute to the biodiversity.

The number of flowering plants known from the Simen Mountains approaches 550 (545 species plus 4 infraspecific taxa). They are distributed over 101 families and 299 genera. Over 75 % of the flowering plants of the Simen area are Dicots; the remainder are Monocots. Gymnosperms, represented by a single indigenous species only (*Juniperus procera*), are negligable. – The figures given here represent our current state of knowledge and replace those given in Puff & Sileshi (2002).

The relatively high percentage of Monocots is primarily due to the large number of grasses (Poaceae); other relatively large Monocot families are the sedges (Cyperaceae) and orchids (Orchidaceae), the latter with both terrestrial and epiphytic members. Amongst the Dicots, the Compositae is the most diverse family (comparable in size to the Poaceae), followed by Leguminosae, Rubiaceae and Scrophulariaceae. Many families (of both Mono- and Dicots), however, are very poorly represented, having only 1 or 2 genera and only a single or few species each (e.g. Hypoxidaceae or Dioscoreaceae; Primulaceae or Sapotaceae).

Phytogeographical aspects

The vast majority of flowering plants known from the Simen Mountains (about 90 %) has distribution ranges which are neither confined to the Simen itself nor restricted to the Ethiopian mountains, but also occur elsewhere [for information on the remaining 10 %, the endemics, see further below]. Of these more widely distributed plants, most are afromontane and -alpine taxa; relatively few others have their centre of distribution elsewhere.

Widely to very widely distributed afromontane and -alpine taxa often have distribution ranges that stretch from Ethiopia southwards to most of the major tropical East African mountains (e.g. the common *Haplocarpha rueppellii* and *Helichrysum citrispinum,* Compo-

sitae, or *Subularia monticola*, Brassicaceae). Some of these have very disjunct ranges: the afroalpine *Sedum crassularia* (Crassulaceae), for example, occurs in both the Northern and Southern Ethiopian Highlands but, in tropical East Africa, is only known from Kenya. Range extensions to the West African mountains are much less common (e.g. *Umbilicus botryoides*, Crassulacae), as are distributions extending to the South African mountains (e.g. the woody *Halleria lucida*, Scrophulariaceae, and the herbaceous *Galium thunbergianum*, Rubiaceae). Noteworthy are also several examples of disjunctions between the mountains of Ethiopia and Southwest Arabia (primarily Yemen), e.g. the Caryophyllaceae *Dianthus longiglumis* and *Silene flammulifolia*, or *Disa pulchella* (Orchidaceae). One subspecies (subsp. *simensis*) of *Primula verticillata* (Primulaceae) is endemic to Ethiopia while the other, subsp. *verticillata*, is restricted to the mountains of SW Arabia and Somalia.

The occurrence of several temperate taxa in the flora of African high mountains is well known. Examples of these which are also known to occur in the Simen include *Arabis alpina* (Brassicaceae) or *Scabiosa columbaria* (Dipsaceae). The common *Erica arborea* (Ericaceae) is an example of a species with a distribution range stretching from the Mediterranean to East Africa.

Species having their centre of distribution in the Sudanian or Sudano-Zambezian region (and taxa with Sudanian or Sudano-Zambezian affiliations) are few and exclusively found in the ± dry, low-lying parts of the Simen Lowlands, often along with afromontane elements. Examples include *Sterculia setigera* (Sterculiaceae) and *Steganotaenia araliacea* (Apiaceae). In addition, there are also some transgressor species, occurring both in the Sudano-Zambezian and afromontane region (e.g. *Clematis simensis*, Ranunculaceae).

Endemism

High mountains of Africa are known for their characteristic endemic flora (Hedberg 1957). According to our present state of knowledge, 12 taxa are strictly confined the Simen Mountains only, i.e. are Simen endemics. Another 44 taxa are Ethiopian* endemics, i.e. they occur in the Simen and other Ethiopian mountains but not outside the Ethiopian Mountain Systems. Thus a total of 56 taxa, or somewhat more than 10 % of the flowering plants growing in Simen Mountains, are Ethiopian* endemics.

*Note that "Ethiopia," in this context, is used in the old, wide sense and includes Eritrea. If one were to be geopolitically correct, an awkward separation into "strictly Ethiopian" and "Ethiopian and Eritrean" endemics would have to be made.

Simen endemics include plants that are either uncommon (or only locally common in certain habitats), such as *Rosularia semiensis* (Crassulaceae) or *Lobelia schimperi* (Lobeliaceae), or rare to very rare taxa such as *Ceropegia sobolifera* (Asclepiadaceae), *Pimpinella pimpinelloides* (Apiaceae) or *Habenaria platyanthera* (Orchidaceae). Some of the rare species, such as *Swertia scottii* (Gentianaceae), *Phagnalon phagnaloides* (Compositae) or *Snowdenia mutica* (Poaceae) may, by now, be extinct as they have never been recollected since their discovery in the 19th century.

Ethiopian endemics are diverse in their general distribution patterns. Some have a very restricted Northern Highlands distribution and are only known from a few localities outside the Simen (e.g. *Hypagophytum abyssinicum,* Crassulaceae, or *Drimia simensis*, Hyacinthaceae). A few taxa have restricted, disjunct distributions (e.g. *Ranunculus tembensis*, Ranunculaceae, or *Artemisia schimperi*, Compositeae, which, in the Northern Highlands, are only known from the Simen and, in the South Highlands, from the Bale Mountains). More widely distributed Ethiopian endemics, with numerous known localities both in the Northern and Southern Highlands, are more common; examples are *Saxifraga hederifolia* (Saxifragaceae) and the perhaps best known Ethiopian afroalpine endemic, *Lobelia rhynchopetalum* (Lobeliaceae).

All of the examples given above refer to taxa whose type collections originated from the Simen (and were mostly made by W.G. Schimper). The Simen, however, also houses Ethiopian endemics whose type collections originate from other mountainous areas of Ethiopia. Examples are *Trifolium schimperi* (Leguminosae) and *Phragmanthera macrosolen* (Loranthaceae), originally collected in nearby Tigray, or *Polyscias farinosa* (Araliaceae).

WILDLIFE IN THE SIMEN

The main purpose for establishing the Simen Mountains National Park in 1969 was to protect endangered and endemic mammal species, primarily the Walia Ibex (*Capra ibex walie*) whose distribution range is restricted to the Simen area. The Simen mountains are also the home of other mammals endemic to Ethiopia such as the Ethiopian Wolf (formerly known as Simen Fox) and the Gelada baboons ("Geladas").

About 20 species of large mammals are recorded from the Simen. Most of these are rarely seen, the only exceptions being the Walia Ibex, Geladas and the Black-and-White Colobus monkeys.

Walia Ibex is mostly observed on steep to very steep, totally inaccessible slopes of the escarpments. The best places to watch them are various places along the Upland edge of the escarpment such as around Sankaber, Muchila Afaf, Saha or Imet Gogo. Strong binoculars – and patience – are needed to spot them. The animals belong to the most endangered mammals in the world; their total known number has supposedly decreased from an estimated 400 individuas to about 250 (one of the reasons why SMNP has been placed on the World Heritage in Danger list). – Klipspinger (*Oreotragus oreotragus*) (partly) occupies the same habitat of the Walia Ibex, but very much luck is needed to see one of these animals.

Especially when approaching some of the most spectacular viewpoints within SMNP (Saha area, Imet Gogo), one is likely to see large groups of Geladas (*Theropithecus gelada*) feeding in Giant Lobelia-studded afroalpine grassland (they are almost exclusively herbivorous) (fig. IP12A). Males stand out by being taller and heavier than females and having a conspicuous brown mane over the neck and a long, heavy cape over the shoulders (fig. IP12B). While wandering freely in the grassland areas during the day, Geladas retreat to the small ledges and rock crevices of the escarpment; also when alarmed, they disappear down the steep escarpment slopes.

In contrast to the above, Black-and-White Colobus monkeys (*Colobus guereza*) (fig. IP12C-D are confined to the Lowlands. They live in afromontane forest patches and are always seen in groups of several, jumping around in tree crowns. They can normally be observed in Adarmaz forest but are also not uncommon in some of the smaller forest areas. The less common Black-faced Vervets (*Cercopithecus aethiops*) occur in the same habitats.

Ethiopian Wolf (*Canis simensis*) (fig. IP12E), living primarily in non-grazed afroalpine grassland with large grass tufts (where it can hide) and preying on the probably endemic Grass Rat, can – with luck – be seen around Gich Camp. It is not to be confused with the Golden Jackal (*Canis aureus*) which may be observed in the same areas (but also elsewhere in Upland grasslands).

The Simen mountains are rich in birdlife. There are possibly about 150 species, about 10 % of which are endemic to Ethiopia. The perhaps most spectacular and easily seen bird in the Uplands is the Lammergeier (or Bearded Vulture, *Gypaetus barbatus*); also the endemic Thick-billed Raven (*Corvus crassirostris*) is common. In general, species richness of endemic and other birds is higher in the Lowlands than in the Uplands. An example of an endemic bird in the Lowlands is the Wattled Ibis. Three species of Sunbirds (Malachite, Tacazze and Variable Sunbird; *Nectarinia* spp.) can be seen pollinating various flowers (e.g. *Leonotis ocymifolia*, Lamiaceae, or *Acanthus sennii*, Acanthaceae).

*Fig. IP12. – Animals in the Simen Uplands (A-B,E) and Lowlands (C-D). – A-B, Gelada baboons; A, part of a large group (males, females, several young; the latter mostly riding on the back of their mothers) in Afroalpine grassland with Giant Lobelias (*Lobelia rhynchopetalum*); B, Geladas prefer to stay near or at the edge of the escarpments; when they feel threatened they will disappear onto the cliffs of the steep escarpment slopes below (male on the left). – C-D, Black-and-White Colobus monkeys in a patch of afromontane forest. – E, Simen Wolf (formerly known as Simen Fox).*

PEOPLE IN THE SIMEN AND THEIR IMPACT ON THE NATURAL VEGETATION

People are living both in the Simen Up- and Lowlands, and not only outside the boundaries of the SMNP. There is a network of settlements all over the Simen, with scattered villages even in extremely remote places. The inhabitants are mostly traditional agriculturalists, with a concentration on the production for subsistence. Yields generally are so low that there are no or only very few surplus products for marketing. In drought years there might even be dramatic food shortages.

The region is inhabited by Amhara people, which are divided into three religions, namely the Ethiopian Orthodox Christians, the Muslims and Felasha (Ethiopian Jews). The latter, having sought refuge in the Simen Mountains from the Aksumite kingdom when it became

Christian, however, are a very small minority, only living in few settlements in remote areas. If one considers the entire area, Ethiopian Orthodox Christian settlements considerably outnumber Muslim villages. Islam, the most recent religion in the area, is however getting stronger and the majority of villages passed during a multi-day Lowland hike along the Simen main escarpment are Muslim. Christians and Muslims in the region, both being Amaharas, have close cultural and economic ties.

The remoteness and inaccessibility of the Simen area has promoted its use as a refuge for people affected by wars, etc. It is, for example, assumed that the Italian invasion before the Second World War resulted in a considerable increase in the human population, and it is suspected that the war with Eritrea (from the 1960's onwards) caused another influx of people. Moreover, there is a *natural* population increase of 2–3 % per year. The population is believed to have doubled within the last 25 years (Nievergelt 1981, Hurni 1986). As a consequence of the sharp population increase, more and more land in the Simen area has been cleared for cultivation; according to some sources, almost 50 % of the landscape of the Simen Up- and Lowlands is used for agriculture (with the percentage being higher in the Lowlands).

Until 1978, over 50 % of the area of the SMNP was used by local inhabitants for agriculture and grazing. After a forced relocation of about 1,500 people from seven Lowland villages in 1979, the human impact inside SMNP was reduced to 33 % for agricultural and grazing land (whereby the area of cultivated land shrank from ca. 19 % to about 11 %) (Hurni 1986).

Simen Uplands

One village, Gich, located North of the Jinbar valley, about 2,5 kilometers Southwest of Gich Camp and at an altitude of ca. 3,550 m, lies within SMNP and a number of other villages are close to the Park border, but outside its boundary (e.g. Argin or Amabaras village) (cf. fig. IP13A-C). In the more remote areas of the Simen, i.e. roughly to the East of SMNP, there are also numerous scattered settlements.

Gich village is quite spread out, and, when visited in recent years, it was found to be continuously expanding; several new huts were always under construction (although this is supposedly illegal). Around the old core of the village there are numerous old trees of *Eucalyptus globulus* (Myrtaceae; one of the several Eucalypts introduced from Australia in 1895, under King Menelik II, and amongst the most widely cultivated Eucalypts in the Ethiopian Highlands); some kosso trees (*Hagenia abyssinica*, Rosaceae), typically found naturally in the Simen Lowlands, had apparently been planted for medicinal purposes (the female flowers are used, *inter alia*, against tape worm). Both in and around the village there were also numerous quite large and old trees of *Erica arborea* (Ericaceae) and *Hypericum revolutum* (Hypericaceae).

The round huts have walls made of large rocks; the roof construction is made of wood (often *Eucalyptus*), and long grass (mostly *Festuca*) is used for thatching; so far, no roofs made of corrugated iron haven been noticed. Huts are normally arranged in small groups

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Fig. IP13. – People in the Simen (A-E, Uplands; F-G, Lowlands). – A-B, Gich village in the wet and dry season; in A, note the many fields on the slopes opposite the village (in the distance, separated by the Jinbar river). – C, Argin village (the trees visible are planted Eucalyptus globulus*). – D, plowing (either with oxen or horses) is still practiced in the same way as it had been done decades ago (see fig. IP11D). – E, donkeys, mules and horses are used to transport goods of all kinds; villagers from remote areas (such as around Ras Dejen) need to hike for several days to reach the nearest major market town (Debark). – F-G, Antola village; as fire wood has become sparse, dried cow dung is used as fuel; it is meticulously collected and piled into pyramids (G, centre). – H, the trail leading from Diwhara (Lowlands) to Chennek (Uplands) is the only Lowlands – Uplands connection along the main Simen escarpment that can be managed by pack animals; all other tracks are too steep.*

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and next to the huts serving as living quarters there are small grain storage huts; dried cow dung, neatly stacked into pyramids, is usually seen outside the huts (used as fuel because of the scarcity of firewood). In home gardens, usually surrounded by stone fences or fences made of *Eucalyptus* branches into which naturally occurring Giant Lobelia (*Lobelia rhynchopetalum*) is often incorporated, horse bean (*Vicia faba*, Fabaceae) and potatoes (*Solanum tuberosum*, Solanaceae) are the most prominent crops; also various spice plants used for cooking are planted.

The villagers keep a larger number of domestic animals, including horses, donkey, mules, cattle, sheep and goats. Many animals were seen grazing in the surroundings, particularly towards Muchila Afaf. Consequently, the vegetation in the surroundings is much disturbed and heavily overgrazed. Particularly cattle also cause serious erosion on the steeper, rocky slopes. On the moderately steep slopes, many animal trails were observed which run more or less parallel to each other and which, in time, have become 30 to 50 cm deep. They mostly lead towards the Northeast and document that herds are driven to the Saha and Imet Gogo on a daily basis. Cattle was seen grazing in the Imet Gogo area as high as 3,850 m, and horses, goats and sheep around Saha (ca. 3,700 m).

Most of the fields of the inhabitants of Gich are on the slopes opposite (i. e. ± South of) the village, on the other side of the Jinbar valley (cf. fig. IP13A). The main crop grown is barley (*Hordeum vulgare*, Poaceae) but, to a limited amount, also wheat (*Triticum* spp., Poaceae) and horse bean are grown; in addition, there are some small fields of linseed (*Linum usitatissium*, Linaceae). Traditional ploughing methods, using oxen or horses, are still used as many decades ago (compare fig. IP13D and fig. IP11D). Ploughing of slopes is always done without forming terraces (the latter would reduce soil erosion). Several fields closer to the village (ca. 1 km to the Southwest) seemed permanently abandoned. This area showed of the worst erosions seen in the entire SMNP. Large-scale sheet and rill erosions were observable and, in some places, soil was completely denuded due to rill and gully erosion.

Soil degradation due to soil erosion on cultivated land, which has occurred since the beginning of agriculture and has never been subject to soil conservation measures, is a problem of major concern. The ratio soil erosion on cultivated land : new soil formation is believed to be in the order of 10–15 times too high for an average cultivated slope. It is, therefore, postulated for many cultivated slopes in the Simen that they will degrade within some 80 years of cultivation to soil depths of less than 10 cm.

In conclusion, it can be said that the Simen ecosystem is dangerously threatened by human utilization. The steady increase in human population, the resultant increased need for more useable land for agriculture and grazing and the regular loss of soil due to careless farming methods have caused an obviously high pressure on land resources. The fragmentation of natural habitats by human-used land poses serious threats not only to the rare plants of the Simen but also to animals such as the endemic Walia Ibex.

Simen Lowlands

The structure of the settlements, building methods of huts, etc. are basically similar to the situation described for the Uplands village of Gich (above) (cf. fig. IP13F-G). Almost exclusively, locally available natural products are used for construction, although in recent years an increased use of corrugated iron sheets for roofing has been noticed (in total, however, probably not more than 5 % of all buildings are currently equipped with such a roof). Sheets of corrugated iron are available in the nearest major market place (Debark), and occasionally mules or donkeys loaded with rolled up sheets, or farmers carrying them on their back, are seen. As the production of surplus products for marketing appears to be limited and, consequently, extra money for luxury items such as corrugated iron is scarce, it is predicted that 'progress' will be very slow.

While the overwhelming number of Simen Lowlands inhabitants are traditional agriculturalists, it was noticed that in some Muslim villages weaving seems to be a source of extra income (weaving is typically done by men; cotton is woven into the traditional clothes of the area). Probably well over 75 % of the older Lowland inhabitants are illiterate. The setting up of elementary schools in recent years, even in some of the most remote areas, will change this. In general, however, infrastructure is poor to non-existent. The nearest town with electricity, pharmacy, basic health service, etc., is Debark which, for those living in more remote places, is a hike of two to several days away.

As in the Uplands, livestock is responsible for heavy vegetation disturbance in the immediate surroundings of villages; in the steeper parts, there are often severe erosions, and the ground is sometimes almost denuded. Often, only unpalatable, disliked or poisonous plants are left behind.

Because of the heavy disturbances around the settlements, fields of the villagers are normally some distance away, sometimes even a kilometer or more, if the land nearby is unsuitable for cultivation. Crops cultivated in the Simen Lowlands are mostly wheat (*Triticum* spp.), barley (*Hordeum vulgare*) and pulses (often *Vicia faba*), but in some parts maize (*Zea mays*) seems to be the commonly grown plant. Crop rotation is practiced and land is cultivated annually. Intermediate fallow years for soil restoration, once frequent, are now reduced due to high pressure on land (Hurni 1986). The result is a decrease in crop yields per land unit because soil fertility is not compensated by active fertilizing expect for, sometimes, ash application. In many areas fields appear to have been permanently abandoned.

PRACTICAL TIPS

Anyone wishing to visit the Simen (both the SMNP or areas outside it) must first see the National Park Office in Debark, because visits without officially approved, trained guides are not allowed (and not recommended). The easiest approach to Debark is via the unpaved, all-weather road from Gondar, roughly 110 km to the Southwest (there is even public transport). The town has many small hotels and Simen visitors must expect to stay one or more nights in them as arranging a trip to the mountains takes time. Particularly if a longer trekking trip is planned for which guides, porters, a cook and packing animals are required (see also further below), a minimum of two days must be set aside for getting everyone together (there are no such things as mobile phones or wireless transmitters!).

Those having very little time and only wishing to see the most scenic places of the Simen can make use of the new road that leads from Debark to the Simen Uplands. It takes one through the entire SMNP, leaving its boundaries again around Chennek Camp to continue to the lower slopes of Mt. Bwahit. A 4-wheel-drive vehicle is recommended as the road is very rough in places (can, with luck, be hired from the National Park; there are, however, no private operators in Debark which offer cars). One day is sufficient for this.

Recommended scenic stops: (1) around Sankaber Camp and a few kilometers below the Camp (around the source of Wazla Wenz) (spectacular views of the escarpment and the Lowlands); (2) in the afroalpine grassland area opposite Gich Camp (Giant Lobelias observable in the distance); (3) around Chennek Camp (escarpment and Lowland views; Geladas are often seen in this area) (see maps, fig. IP2).

Places to stay in the mountains. Three camps are located in the Uplands part of SMNP, namely Sankaber, Gich and Chennek Camp, and three in the Lowlands part, namely Adarmaz, Muchila and Dirni. Only one of these, Sankaber Camp, has a house with several double beds. The others have no facilities. It is, therefore, necessary to take a tent (and sleeping bag). Tents are also required for any visits to the more remote areas of the Uplands (outside the SMNP boundary) and for multi-day hikes in the Lowlands.

Below are a number of suggestions for several-day trekking trips both in the Simen Uplands and Lowlands, with the approximate number of days needed:

Trekking in the Simen Uplands (fig. IP14, 1–3)

1) Debark – Sankaber Camp – Gich Camp and back. The minimum time required for this round trip, which takes you to the core part of SMNP, is 4 days and 3 nights (2 at Sankaber, 1 at Gich). Gich Camp can be reached on two alternative routes, one via Gich village, the other by first following the Sankaber–Chennek road and then turning North. It is recommended to take both, one for the trek to, the other for the trek back from Gich Camp.

Anyone interested in seeing afromontane forest can visit the easily accessible Wazla Wenz forest; follow the road to Chennek until it reaches the source of Wazla Wenz and continue downstream. One extra day and an additional night at Sankaber Camp is needed.

To get a good impression of afroalpine vegetation, it is worthwhile to spend an additional 1 or 2 nights at Gich Camp and make day trips to the Saha area and the entrance to Dirni Gorge (cf. fig. IP15A) and/or to the summit of Imet Gogo. In both areas, some of the interesting and rarer plants of the steep cliffs of the escarpment can be seen.

2) as above, but continue from Gich Camp to Chennek Camp. Two additional days and a night at Chennek Camp are needed. Both scenery and vegetation on the way to and around the Camp are spectacular; a visit is strongly recommended.

A worthwhile day trip is the trail to the rocky summit of Mt. Bwahit (fig. IP15B); add another night in Chennek. Those wishing to see a Simen Lowlands village and to get some impression of afromontane vegetation of the Lowlands can take the trail down the main escarpment which starts in the vicinity of Chennek and leads to Diwhara village. Two days (and a night in the village) should be set aside if one wants to have a good look around, but basically the trip down and back up the escarpment can be done in a single day.

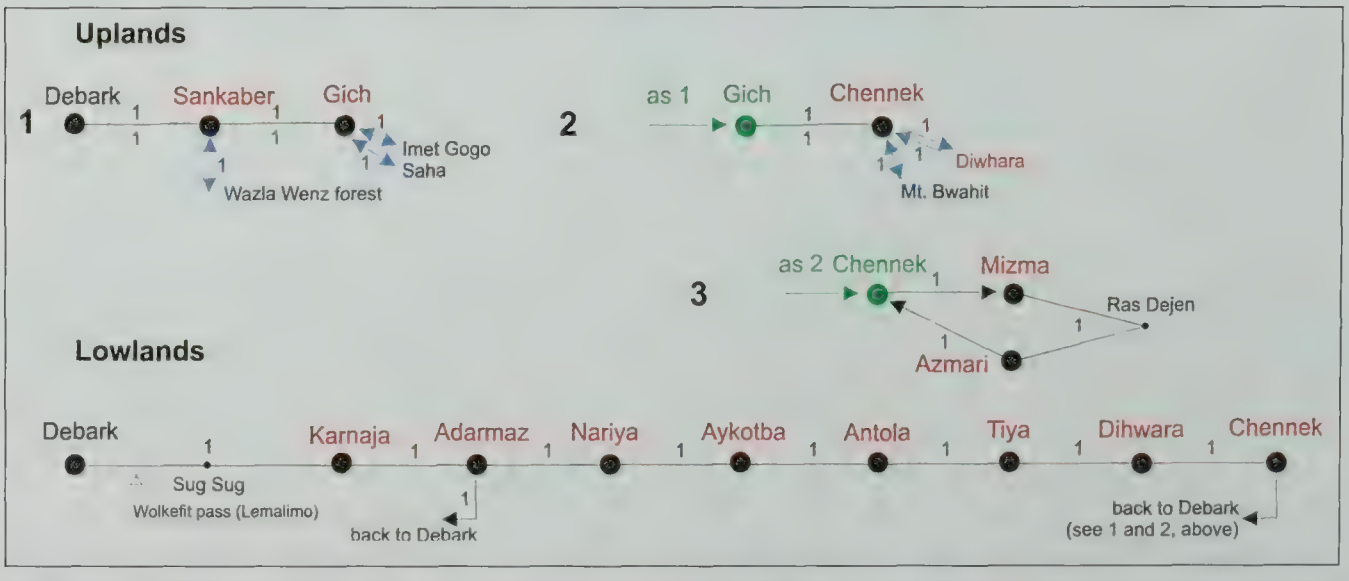

Fig. IP14. – Trekking in the Simen Uplands (1–3) and Lowlands. – Overnight stops (camps or villages) are shown in red; Uplands: optional day trips to various localities are indicated by blue arrows; distance between locations: "1" = approximately a 1-day-hike. See text fur further explanations.

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Fig. IP15. – From the Simen Mountains National Park to Ras Dejen and back. – A, view of Mt. Silki (4,420 m, in the far distance), taken from the entrance to Dirni Gorge (Simen escarpment between between Saha and Imet Gogo). – B, Mt. Bwahit summit (4,430 m), view towards the Northeast. – C, view of Mesheha (or Meshaha) valley (ca. 2,800 m), a very dry region obviously in the rain shadow; this is the only place in the area were succulents like Huernia *(Asclepiadaceae-Stapelieae),* Delosperma *(Aizoaceae) or* Euphorbia abyssinica *(foreground) occur. – D, view towards the Ras Dejen area (far distance). – E, view of Kiddis Yared (on the way back from Ras Dejen to Mt. Silki and Mt. Bwahit).*

A
B
C
D
E

3) Ras Dejen round trip. A trek to the highest mountain of Ethiopia leads through very remote, partly totally uninhabited areas and is characterized by spectacular scenery. Starting from Chennek Camp, it takes 3 days and 2 nights to make the entire round trip; a guide well acquainted with the area is required as there are several alternative trails.

The route suggested here first crosses the top of Mt. Bwahit and then gradually drops down to the Meshaha valley, an exceptionally dry, botanically very interesting area. After crossing the Meshaha river, the terrain rises moderately to sharply and eventually Mizma village, the first night's stop is reached (alternatively, one can stay overnight in nearby Ambikwa village). One the second day, Ras Dejen is reached at about mid-day. From there, there are basically two options to return to Chennek. The more northerly trail (recommended!) leads towards Kidis Yared mountain and skirts around its base; any village in this area can serve as overnight stay, the perhaps most convenient being Azmari. On the third day the trail turns toward Mt. Silki and eventually leads to Arkwasiye village from where a major trail leads back to Mt. Bwahit and Chennek Camp.

Trekking in the Simen Lowlands (fig. IP14, bottom)
A trek through the Lowlands along the base of the main (Northern) Simen escarpment and covering its entire length will take 8 days (and 7 overnight stops), whereby the last, 8th day is the trip up the escarpment, to Chennek Camp. From there, add at least 2 days for the return trip to Debark. This entire route can be managed by packing animals (which are needed to carry provisions, cooking utensils and possibly also other expedition gear). The trek is strenuous and every day, a wide range of altitudes is to be covered (see diagram on p. 15). Distances covered per day vary and depend on how difficult the terrain is, and on suitable villages as spots for overnight stays. Particularly the first day (from Debark down the Wolkefit pass to Sug Sug; from there to the Karnaja area) is a very long and tiring day. The Karnaja area is chosen as a stop-over because, even in the dry season, water is available. The second day, to Adarmaz Camp, is easier and there is time left to spend a couple of hours in Adamaz forest. Those interested in having a closer look at the forest should spend a full day there [another overnight stay at Adarmaz and one more day to be added to the total length of the Lowlands trip]. The hike from Adarmaz to Nariya, again is very strenuous as one has to descent to 1,700 m (Jinbar valley bottom) and then has a steep climb to Nariya. After that, the terrain gradually rises (from ca. 2,150 m at Nariya to 3,050 m at Dihwara). – To get an impression of the rugged terrain to be covered during the Lowlands trek see fig. IP16.

The sequence of the Lowlands trip can, of course, also be reversed, and one can start from Chennek. In our (subjective) opinion, however, starting from Wolkefit pass (Lemalimo) and the Sug Sug area is more rewarding as the scenery becomes more interesting and spectacular on each day.

Abbreviated Lowlands trek. Between the Sug Sug area and Dihwara there are several trails connecting the Lowlands with the Uplands. Except for the trail leading from Adarmaz Camp to the Uplands, it is strongly WARNED against using them (unless one has full mountaineering equipment). They are mostly totally unsecured, lead up almost vertical cliffs and use as climbing aids wooden ladders which may not be in good condition (i.e. half-rotten or totally disintegrated). The Adarmaz–Uplands trail, in contrast, has recently been improved by the installation of steel ropes and steel ladders and is manageable without special

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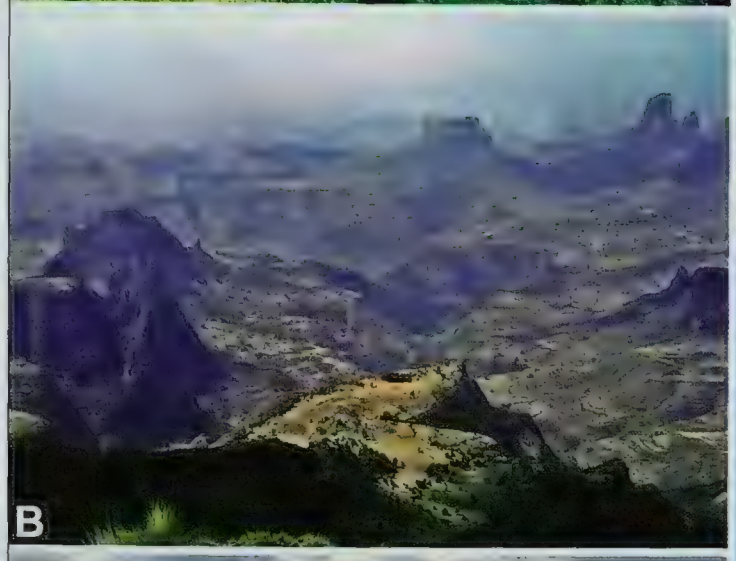
Fig. IP16. – Select views of the Simen Lowlands, taken at the upper edge of the escarpment (A,D-E, dry season; B-C, wet season). – A-B, flat-topped spur with Antola, a Muslim village with a protected "graveyard forest;" the latter is clearly visible both in the wet and dry season as a dark spot near the tip of the spur (view from Saha area). – C-D, cultivated plateau with Dirni village in the distance, C, view from Saha area, D, from Imet Gogo summit. – E, cultivated plateau with Truwata village (view from Imet Gogo summit).

A


B

C

D

E

mountaineering equipment. Nevertheless, it is not recommended for the faint-of-heart or for persons not free from giddiness. When considering using this route, also keep in mind that packing animals can obviously not make it up this trail! See fig. IP17.

The only possible abbreviated Lowlands hike, thus, makes use of the Adarmaz–Uplands trail. A short, 3-day Lowlands trip (see fig. IP14, bottom) starts from the Sug Sug area, but the areas passed are neither botanically nor scenically as nice as the Lowlands further to the East. The second alternative is to start at Chennek and continue to Adarmaz. This is botanically and scenically more rewarding but will take considerable longer (2 days for the Debark – Chennek trek; 6 days in the Lowlands; 1 day for the trip from Adarmaz up the escarpment and back to Debark).

TREKKING MAPS. The only recommendable map is the *Simen Mountains Trekking Map* (scale 1 : 100.000) by the University of Berne. First published in 1981, it has now been revised and the second edition has been available since 2003. Well assorted Map Centres and Stores should have it in stock.

Fig. IP17. Up the Adarmaz Gorge (Adarmaz–Uplands trail).

NOTES ON THE BOTANICAL PART OF THIS BOOK

The arrangement of the plant families of the Gymnosperms, Mono- and Dicots (and the sequence of genera and species within families) follows the "*Flora of Ethiopia*" (1989), after Eritrea's independence renamed "*Flora of Ethiopia and Eritrea*" (1995 to present; see References for full citations; abbreviated "FEE" throughout the Botanical Part). Numbers in brackets after the family names correspond to those used in the Flora. For families included in Flora volumes not yet published (see References) genus and species sequences are, in part, preliminary.

Family descriptions are followed by keys to taxa *only* if three or more taxa occur in the Simen. A brief description is included for each taxon recorded from the area. Its occurrence is given in coded form*; this is followed by abbreviated ecological data, a statement on common- or rareness** and information on flowering and fruiting period (if known)***. A Note is added only if it was deemed necessary (i.e., if a taxon is newly recorded for the Simen, if it is endemic to the Simen or the Ethiopian highlands, if only one of the subspecies of a taxon occurs in the Simen, etc.).

* **UL** = Simen Uplands, i.e. the high plateaux areas and mountains, generally from above 3,000 to ca. 4,500 m.
LL = Simen Lowlands, i.e. the area below and along the base of the main (Northern) Simen escarpment, generally below 3,000 m, to below 2,000 m); also other low areas (such as the Mesheha river valley area on the trail from Mt. Bwahit to Ras Dejen) are included under Lowlands.
ESC = the escarpment areas between UL and LL.
Infrequent occurrence in one of these three main areas is indicated by brackets, e.g. (LL), ESC, UL = normally found on the escarpments and in the Uplands, but not often seen in the Lowlands.

** The statements (1) **Common**, (2) **Uncommon**, and (2) **Rare** are of course subjective. Normally, (1) means that a plant is usually often seen in a particular area (LL, ESC, UL), (2) means that one has to be lucky to see the plant, and (3) means that is only known from few to very few localities and, consequently, is very rarely seen. – Sometimes, more detailed information is given, e. g. **Locally common/rare**; using the succulent candelabra tree *Euphorbia abyssinica* as an example, it means that it is quite common on the dry slopes of the Mesheha river and its tributaries, but probably absent elsewhere in the Simen.

*** **Flowering and fruiting periods**. A general statement on whether a plant tends to flower/fruit in the wet (rainy) or in the dry season was considered to be more sensible than giving flowering/fruiting times by month.

Flowering [or fruiting] *in the wet season* = approximately within the period May to October (and locally also sparse rains in February and March).

Flowering [or fruiting] *in the dry season* = approximately within the period November to April.

When designing this flora, we decided that USER FRIENDLINESS should have first priority. Consequently, the description of a given plant taxon and its illustration will be on facing pages, or – sometimes – on the same page. This approach, however, also means that lengths and extent of descriptions are not always uniform but depend on the number of taxa illustrated in a full-page figure. To make identification easier, descriptions of taxa which are not illustrated are generally more extensive.

Descriptions are kept as non-technical as possible, but for genera and species of certain families it is unavoidable to use specialized terms for some of their character states. For this reason, an abbreviated Glossary of Botanical Terms is included after "References".

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Vol. 4,2 (Asteraceae) – to be published soon

Vol. 5 (Gentianaceae - Lamiaceae) – to be published soon

Vol. 6:

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GLOSSARY OF BOTANICAL TERMS

(abbreviated; based on the Glossary included in the Flora of Ethiopia and Eritrea volumes)

abaxial – the side or part facing away from the stem; the lower surface of a leaf (= dorsal); compare with adaxial.

abortion – the failure of a part to develop fully, suppression of a part usually present.

acaulescent – without an easily seen stem.

achene – a small dry 1-seeded fruit, not opening when ripe; the fruits of Asteraceae (Compositae).

actinomorphic – used for flowers which are radially symmetrical (at least in the perianth) and can, therefore, be divided along two or more longitudinal sections into halves which are mirror images of each other; the term applies mainly to the perianth: used as synonymous with radially symmetrical or regular, compare with zygomorphic and irregular.

acuminate – with a tip that becomes gradually narrower to a slender point.

acute – with a tip that comes to a sharp point with straight-sided edges forming an angle of < 45°.

adaxial – the side or part facing the main stem; the upper surface of a leaf (= ventral); compare with abaxial.

adnate – when an organ or part is united to a different organ or part; for example the androecium (stamens) with the gynoecium (pistil) in Asclepiadaceae and Orchidaceae.

adpressed – parts pressed closely to the axis.

aerial – of stems which arise from horizontal rhizomes; of roots which arise from stems and which have special functions such as the aerial roots of orchids which absorb water, and the aerial roots of climbers which attach the plant to its substrate.

alternate – used for leaves that are attached, one at each node, at different levels along the stem; used for stamens borne between the sepals or petals.

amplexicaul – used for leaves where the base clasps the stem.

androgynophore, **androphore** – an elongated part of the receptacle above the perianth either carrying both androecium and gynoecium or only the stamens; occurs in certain bisexual flowers.

annual – a plant which completes its life cycle in one growing season and then dies.

anterior – away from the axis (= abaxial); often used for the petal(s) found on the front of a flower.

anther – the part of the stamen producing the pollen, usually divided into pollen-sacs or pouches called thecae.

anthesis – the time when the pollen is shed and the stigma is receptive to pollen; from the opening of the flower bud to the setting of the seed.

apex – the tip or end-point of a structure.

apical – concerning or near the apex.

apiculate – ending abruptly in a short sharp point.

appressed – lying close or pressed flat against a surface or axis.

aquatic – living in water.

aril – an outer covering or appendage, often fleshy and/or brightly coloured, that encloses the seed or part of the seed and develops from the stalk of the seed.

ascending – a plant where the shoots start lying on the ground and then turn to grow mainly upright; usually used for herbs.

axil – the upper angle made between a leaf attachment and a stem.

axillary – in or arising from an axil.

barbed – with stiff short spines or bristles that point backward away from the apex of the organ.

barbellate – shortly barbed.

berry – a fleshy or juicy fruit with a soft outer portion and the seeds immersed in the fleshy or pulpy tissue, the seeds are not surrounded by a woody or stony endocarp for example tomato. Compare with drupe.

biennial – living for two growing seasons; usually pr only vegetative growth in the first season, and flowering and fruiting in the second.

bifid – divided into two parts near the top.

bifoliate, **bifoliolate** – having two leaves or two leaflets, respectively.

bipinnate – twice pinnate, when the first divisions of a leaf are themselves pinnate.

bipinnatifid – twice pinnatifid.

bisexual – having both sexes and producing both male and female gametes. Bisexual flowers have both functional stamens and pistils.

bract – a small leaf-like structure usually associated with a flower and/or inflorescence and found at the base of the pedicel or peduncle.

bracteate – having bracts.

bracteole – a small bract on the pedicel, or close under the flower, between the bract and the flower.

bulb – a short underground stem with a crown of usually fleshy overlapping scale-like leaves, for example an onion.

caducous – falling off soon or quickly.

caespitose – forming mats or broad tufts.

calyx – the outer whorl or envelope of most flowers, made up of the free or united sepals.

campanulate – bell-shaped, with a broad tube and a wide opening.

circumscissile – opening as if cut circularly and the upper part coming off like a cap or lid.

compound – composed of two or more similar parts; the opposite of simple (e.g. compound leaf, composed of leaflets).

connate – when parts of the same kind are united.

cordate – when the base of the leaf is deeply notched; heart shaped.

cordiform – 'heart-shaped', an ovate leaf with a pointed and a heart-shaped base.

coriaceous – with a thick and firm texture, similar to leather.

corolla – the inner whorl or inner envelope of sterile appendages in the flower, made up of the free or united petals which are usually colourful.

crenate – the margin notched with rounded or broad and blunt teeth or projections.

deciduous – falling off at the end of the growing season; the opposite of evergreen.

decumbent – lying on the ground but with the ends growing upwards.

decussate – when each pair of opposite leaves is inserted on the stem at right angles (90°) or perpendicular to pairs of leaves both above and below.

dehiscence (dehiscent) – the method or process of opening; as in anthers and fruits.

dentate – with a toothed margin, the teeth pointing outwards, not forward; compare serrate.

denticulate – with very small teeth perpendicular to the margin.

dioecious – plants with unisexual flowers in which the male and female flowers are not found on the same plant, as if the plants are either male or female, but not both.

dissected – divided into many slender parts.

dorsal – the back or side away from the stem or central axis, the abaxial side; the opposite of ventral and adaxial.

drupe – a fruit with a fleshy exterior and with the seed or seeds enclosed in a hard covering formed by the inner part (the endocarp) of the ovary wall, which forms a hard `stone' around the seed.

elliptic – having the shape of an ellipse, broadest at the middle; a rounded two dimensional figure that is symmetrical but has a long and a short axis, as an leaf

entire – with an even and continuous margin without teeth, etc.

fimbriate – with a fringe or series of slender structures along the margin.

floccose – covered with soft wool-like hairs that often rub off

gibbous – with a pouch or inflated on one side.

glabrescent – becoming glabrous; nearly hairless.

glabrous – without hairs, a surface devoid of hairs.

glochid; **glochidiate** – a very small spine or bristle barbed at the tip; glochidiate: with glochids.

habit – the overall appearance of a plant.

head – an inflorescence of closely packed flowers that is more or less round or disc-shaped.

heterogamous – when an inflorescence bears more than one kind of flower, e.g. bisexual and male, as in many Asteraceae (Compositae).

homogamous – when all the flowers of an inflorescence are of the same kind.

imparipinnate – odd-pinnate with 1, 3, 5, etc. leaflets; pinnate with a single leaflet at the end of the rachis.

inferior ovary – an ovary that is below the attachment of the sepals, petals, and stamens. Compare with superior ovary.

inflorescence – the flowering portion of a plant; also used for the arrangement of flowers on the flowering axis.

interpetiolar – between the petioles, as an interpetiolar stipule that extends from the base of one petiole across the stem to the base of the petiole of the opposite leaf (example: Rubiaceae).

involucre – a number of bracts that surround the base of an umbel or the base of a flower-head.

irregular – (of flowers); having bilateral symmetry so that the corolla can be divided equally only along one plane, used as synonymous with zygomorphic, compare with regular and actinomorphic.

lanceolate – with the shape of the end of a lance or spear, tapering to both ends from a broader middle, as in a lanceolate leaf; usually used to indicate a shape which is widest below the middle, but occasionally also at the middle.

ligulate – with the shape of a tongue or strap; flowers of the Asteraceae (Compositae) that have a strap-shaped corolla.

lip – the large lobes of a 2-lipped corolla, or the large, usually abaxial, tepal of the Orchidaceae.

nut, **nutlet** – a fruit with a hard outer covering that does not split open when ripe, mostly comparatively large and with one or two seeds; a nutlet a small nut.

oblanceolate – with the shape of the end of a lance or spear but with the narrow end towards the base; the inverse of lanceolate.

oblong – a plane shape longer than broad with nearly parallel sides, almost rectangular in outline but with rounded ends and with the length two or three times the width.

obovate – a plane shape with an egg-shaped outline but with the broadest part near the apex and the narrow side near the base.

opposite – a term used for two leaves or two branches that arise from the same node on the opposite sides of the stem; a term also used for organs that arise opposite each other or when one arises at the base of another, as stamens opposite a petal or sepal.

palmatifid – with palmately arranged lobes, the leaf being divided more than halfway to the single point from which the nerves radiate.

palmatilobed – with palmately arranged lobes, the leaf being divided halfway or less to the single point from which the nerves radiate; compare with palmatifid.

palmatipartite – palmately divided almost to the centre or midrib.

palmatisect – palmately divided to the centre or midrib.

paripinnate – a pinnate leaf with an even number (2, 4, 6, 8, etc.) of leaflets and without a single leaflet at the end; the same as even-pinnate; compare with imparipinnate, odd-pinnate.

pedicel – the stalk of a single flower within an inflorescence or group of flowers (also used for the stalk of a solitary flower).

peduncle – the stalk that bears an inflorescence consisting of two or more flowers; the flowers may themselves each have a stalk (the pedicel) or be without a stalk.

penninerved – with pinnate nervation.

perennial – living for three or more growing seasons. perfect flower – a bisexual flower with stamens and pill functional.

petal – a flat and usually broad part of the inner whorl at sterile appendages in the flower that together are the corolla, different from the outer whorl (sepals) often brightly coloured.

petiole – the stalk of a leaf on which the blade is borne.

pilose – with a loose covering of soft long simple hairs.

pinnate – when a compound leaf has its leaflets borne al an extension (the rachis) of the leaf-stalk (petiole) or when the leaflets are borne on divisions or branches of the rachis; leaves can be bipinnate, tripinnate, etc.

pinnatifid – with the margin divided more than halfway to the midvein or centre and forming pinnate lobes.

pinnatilobed – with the margin divided to about half the distance to the midvein or centre and forming pinnate lobes.

pinnatipartite – with the leaf divided almost to the midvein or centre and forming pinnate lobes.

pinnatisect – with the leaf divided to the midvein or centre and forming pinnate lobes.

polygamous – when a plant or different plants of the same species have both bisexual and unisexual flowers.

posterior – towards the axis, on or nearest the axis (adaxial or ventral); the opposite of anterior.

procumbent – with stems that lie on the ground.

pubescent – with a covering of soft hairs.

raceme – an indeterminate inflorescence in which the flowers are borne along a single axis with the uppermost the youngest, each flower with a stalk of about the same length; compare with cyme.

racemose – arranged like a raceme.

regular – (of flowers) radially symmetrical or actinomorphic, a flower that can be divided into two equal halves by two or more vertical sections (some authors consider regular synonymous with symmetrical and include both bilateral and radial symmetry); compare with irregular, and zygomorphic.

revolute – with the margin or tip rolled or bent backwards towards the centre.

rhizome – a root-like stem on or beneath the ground with roots growing downwards and leaves and shoots up differing from a true root in the presence of buds, leaves, or scales; especially robust rhizomes are often called rootstocks.

rootstock – a short, vertical, underground stem, bearing roots.

rosette – a cluster of parts in a circular form; often used for leaves produced at ground level.

rosulate – when the leaves are in a circle or in a rosette.

sagittate – arrow shaped; the base has two acute lobes that point backwards to the base of the petiole.

sepal – a flat part of the outer whorl of sterile appendages that protects the flower in bud, often green or dull in colour; the sepals together are called the calyx.

sessile – without a stalk, meaning 'seated'.

solitary – one alone and without companions or similar structures; as a solitary flower in the axil of a leaf.

spike (spicate) – an indeterminate inflorescence with the flowers sessile (without stalks or pedicels) on a simple unbranched or undivided axis or rachis.

spine – a hard sharp-pointed structure, often long and narrow.

spinescent – ending in a spine or in a very sharp hard point, or provided with spine-like teeth.

spinose – having spines.

staminode – a non-functional stamen, often highly modified or reduced.

stipules – scale-like or bract-like appendages, usually found in pairs, at the base of the petiole; many leaves have three parts: the blade, the petiole, and a stipule pair.

superior ovary – an ovary that is borne above the attachment of the sepals, the petals and the stamens; the opposite of inferior ovary.

sympetalous – with the petals at least partly united.

terminal – found at the end; near or at the apex.

thorn – an abbreviated shoot with limited growth, ending in a sharp hard point.

trifoliate – with three leaves; compare with trifoliolate.

trifoliolate – of a compound leaf with three leaflets as in *Trifolium* Fabaceae (Leguminosae).

umbel (umbellate) – an inflorescence in which the pedicels of the flowers all arise from one point and the flowers are borne at one level; the umbels themselves may be arranged in an umbel called a compound umbel, as in the Apiaceae (Umbelliferae).

unifoliate – a leaf with a single leaflet where the leaf-stalk of the leaflet can be differentiated from the main leaf stalk.

unilocular – with one locule or chamber.

unisexual – producing either male or female gametes, but not both; having either functional stamens or functional ovaries (ovules) but not both; the opposite of bisexual.

verticillaster – an inflorescence which has opposite cymes forming whorls of flowers at the nodes along an elongated axis; typical of most species in Lamiaceae (Labiatae).

verticillate – having parts arranged in whorls.

whorl – when there are three or more leaves or flowers at a single node or at the same level.

zygomorphic – flowers having bilateral symmetry so that the corolla can be divided equally only along one plane, used as synonymous with irregular, compare with actinomorphic.

Botanical Part

Ceropegia sobolifera (Asclepiadaceae), a Simen endemic

GYMNOSPERMS

Plants that lack flowers in the usual sense. They produce seeds and are therefore included within the seed plants. *Gymnosperm* means "naked seed", referring to the fact that the seeds are not enclosed, in contrast to the Angiosperms (see below).

CUPRESSACEAE

Monoecious or dioecious shrubs or trees. Leaves scale-like or needle-shaped. Cone scales arranged in alternating whorls. Male cones (or strobili) loose, terminal or on short lateral shoots. Female cones with 1-several ovules at the base of each fertile scale, woody or fleshy and berry-like.

Juniperus procera Endl.

Straight evergreen tree up to 40 m tall. Leaves in whorls of 3, linear, spine-tipped on young plants and decussate, scale-like on mature plants, variable in size. Male cones ellipsoid to subglobose, yellowish. Female cones subglobose, berry-like, blue- to purplish-black when ripe, with 1-4 flattened or triangular seeds remaining enclosed in the cones.

LL. Dry afromontane forest remnants; sometimes solitary trees in and around villages, occasionally a component of graveyard forest. Generally not too common.

Note. Mostly found from Muchila village eastward to Truwata village. Tall, old individuals appear restricted to graveyard forests (e. g. nr. Antola village). – Outside the Simen, the species is quite common in some parts of the Ethiopian highlands. There, it is often associated with *Olea europaea* subsp. *cuspidata* (syn. *O. africana*). Such *Juniperus – Olea* forests do not occur in the Simen area.

Cupressus lusitanica Miller, an exotic species native to tropical Mexico and Central America, grows around Sankaber Camp; it is also (very rarely) seen in and around villages in the LL.

The species is grown as a forest tree (very often as a monoculture) in most highland areas of Ethiopia (there is a small plantation outside Debark, towards Lemalimo Wildlife Sanctuary). Its name (*lusitanica* = from Lusitania, Portugal) is misleading because it does not to refer to the plant's place of origin; the species was merely described from plants which had been introduced to Lusitania in the 17th century. Similary, the trade name 'Cedar of Goa' gives the wrong impression that the plant is from Goa, India.

It is easily distinguished from *Juniperus procera* by its woody cones which eventually open to release winged seeds and by its growth form (25–30 m tall tree with broadly pyramidal crown with pendulous branches in older individuals).

ANGIOSPERMS

Seed plants in which the ovules and seeds are enclosed in structures called carpels. Angiosperms are divided into two major groups, the Dicots (or Dicotyledons) and the Monocots (or Monocotyledons), of which the former is by far the larger.

DICOTS

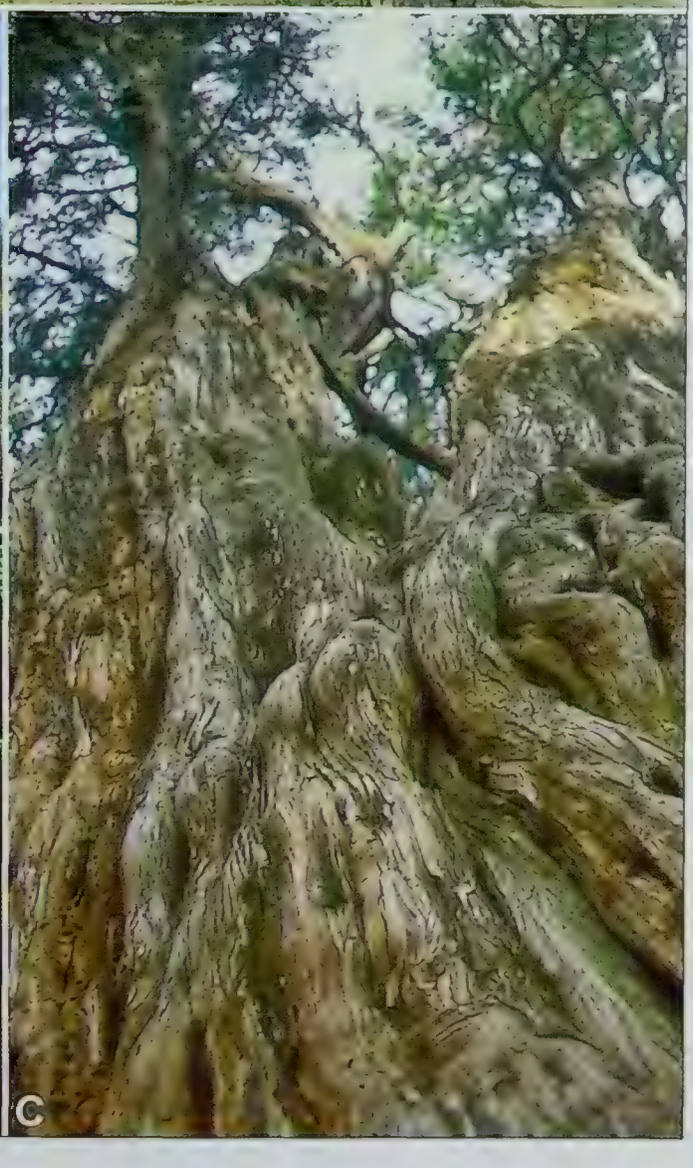
Characterized by having two seed-leafs or cotyledons. Very variable in growth form, both herbaceous and woody plants (the latter with "typical" secondary growth) are common. Leaves either simple or compound, variously arranged, sometimes with stipules. The flowers most typically have their parts arranged in whorls of 4 or 5 ("4- or 5-merous") (although there are numerous exceptions). Their perianth is typically differentiated into a calyx (comprised of often greenish, not showy sepals) and a corolla (comprised of normally colored and showy petals). Stamens are often either present in two or one whorls and in the same number as the petals, or in large numbers. Gynoecia are either free from each other or fused to form 2- to several-loculed either superior or inferior ovaries which contain many to one ovules.

Fig. G1. Juniperus procera. – *A, older individual at Tiya village; B, young trees at Antola village; C, stem of old tree (graveyard forest nr. Antola); D, branch with berry-like female cones.*

A

B

D


C

RANUNCULACEAE (5)

Herbs or ± woody climbers (*Clematis*). Leaves alternate or opposite (*Clematis*), simple, deeply divided or compound. Flowers regular or irregular (*Delphinium*), bisexual or occasionally unisexual (*Thalictrum*), with the parts typically arranged in spirals along a ± elongated or contracted receptacle. Perianth segments various in number, free, of one type ('tepals') or differentiated into sepals and petals (the latter often with nectar-producing areas near their base). Stamens numerous, free. Carpels 1 to many, mostly free, with 1 to several ovules. Fruits nutlets, sometimes with plumed styles, or dehiscent follicles.

1 Climbers, sometimes ± woody, leaves opposite ..... 2 (*Clematis*)
Non-climbing perennial (or sometimes annual) herbs, leaves spirally arranged 3

2 Leaves 3-pinnate; flowers pendulous, perianth ± bell-shaped, red-orange to lemon outside ..... *Clematis longicauda*
Leaves 5-pinnate; flowers held erect, not bell-shaped, perianth segments spread out, pale yellow to white ..... *Clematis simensis*

3 Perianth of sepals and petals; flowers mostly bright yellow (rarely white) ..... 4 (*Ranunculus*)
Perianth not as above; flowers never bright yellow 10

4 Leaves pinnate ..... *Ranunculus oreophytus*
Leaves 3-lobed or dissected 5

5 Leaves 3-lobed or ternately divided 6
Leaves pinnatisect 8

6 Flowers subsessile (pedicels < 5 mm long), very small (ca. 5 mm in diam.) ..... *Ranunculus distrias*
Flowers distinctly pedicellate (pedicels usually several cm long), (considerably) larger 7

7 Flowers typically bright yellow ..... *Ranunculus oligocarpus*
Flowers typically white ..... *Ranunculus stagnalis*

8 Petals 5 (rarely 6); sepals reflexed at anthesis ..... *Ranunculus multifidus*
Petals 8 to > 10; sepals spreading at anthesis 9

9 Stems glabrous except for a few scattered hairs; leaves much dissected, segments ± linear ..... *Ranunculus simensis*
Stems ± pilose; leaves with broader segments ..... *Ranunculus tembensis*

10 Flowers deep blue, to ca. 3 cm in diam.; perianth forming a distinct spur ..... *Delphinium dasycaulon*
Flowers green to purple or white-green, without spur, much smaller ..... 11 (*Thalictrum*)

11 One (rarely 2) stipitate carpels per flower; pedicels hair-like and elongated to several cm in fruit ..... *Thalictrum rhynchocarpum*
Three to 6 (or more) carpels per flower; pedicels not hair-like and only about 1 cm long in fruit ..... *Thalictrum schimperianum*

Clematis longicauda Steud. ex A.Rich.

Climber up to 8 m or more long. Leaflets typically 3, ovate to cordate, to > 10 cm wide. Inflorescences with 3–4 ± bell-shaped, hanging flowers, ca. 3 cm in diam. Stamens and pistils many. Nutlets with persistent plumose styles to ca. 8 cm long.

LL, **ESC**, **UL**. Steep rocky places; edge of scrub and forest. Uncommon. Flowers in the wet season, fruits in the dry season.

Clematis simensis Fresen.

Woody climber with stems to well over 20 m long. Leaflets typically 5, ovate-lanceolate, to ca. 5 cm wide. Inflorescences many-flowered; flowers with 4 spreading perianth segments, ca. 2–3 cm in diam. Stamens, pistils and nutlets as above, but styles only to ca. 4 cm long.

ESC, **UL**. Edge of scrub, bushland, *Erica* forest. Common. Flowers in the wet season, fruits in the dry season.

Fig. D1. – A-B. Clematis simensis; *A, flowering, B, in fruit (nutlets with plumed persistent styles). – C-E, Thalictrum spp.; C-D,* T. rhynchocarpum, *C, in fruit (fern* Adiantum, *with similar-looking leaflets, on the right), D, pedicels with flowers and young fruits; E,* T. schimperianum, *male flowers.*

Thalictrum rhynchocarpum Dill. & A.Rich.
Erect perennial to ca. 3 m tall. Leaves 2-, 3- or 4-pinnate, leaflets simple or ternate, variously lobed or toothed. Inflorescence a diffuse panicle. Flowers on long hair-like pedicels, elongating in fruit, small, sometimes male and bisexual on one inflorescence; perianth segments (2 or) 4, green to purplish or whitish-green with reddish-purplish veins; stamens numerous; only 1 (rarely 2) stipitate carpels per flower. Nutlets to 15 mm long.

LL. Forest patches along streams, usually in shade. Common. Flowers in the wet season.

Thalictrum schimperianum Hochst. ex Schweinf.
Similar to the above but smaller and with lax, leafy inflorescences; pedicels not markedly elongating in fruit. Flowers with 3 to more carpels. Nutlets only to 4 mm long.

LL, **UL**. Damp, shady places in forest. Uncommon. Flowers in the wet season.

Note. Endemic to Ethiopia.

Ranunculus distrias Steud. ex A.Rich.
Dwarf annual to 15 cm tall with stems prostrate at base or erect. Leaves trisect, each segment 3- or more-lobed, smooth or hairy. Flowers solitary, opposite the leaf axils, subsessile, very small (ca. 5 mm in diam.); sepals and petals 3–4, the latter pale yellow, falling off soon. Nutlets with shortly hooked beaks.
LL. Moist grassland; steep banks. Rare. Flowers in the wet season.
Note. Endemic to the Simen and the upland areas of Shewa.

Ranunculus oreophytus Del.
Perennial with large, well-developed rootstock and swollen storage roots. Leaves pinnate, in basal rosette. Flowers distinctly pedicellate, ca. 2.5-3 cm in diam.; sepals and petals 5, the latter (bright) yellow. Nutlets with straight or curved beaks formed by persistent styles.
UL. Grassland, often in ± moist places. Common. Flowers in the wet and dry season.

Ranunculus stagnalis Hochst. ex A.Rich.
Procumbent to ascending or erect herb with somewhat thickened roots. Leaves all basal, deeply ternately divided. Flowers axillary, solitary or in leafy terminal inflorescences, ca. 2–2.5 cm in diam., with pedicels to 5 cm long; sepals 5, petals 6–10, white, rarely pale yellow. Nutlets shortly beaked, in spherical heads, on pedicels becoming reflexed in ripe fruit.
UL. Stream sides, swampy places. Rare. Flowers in the wet and dry season.

Ranunculus oligocarpus Hochst. ex A.Rich.
Diffuse prostrate herb with thickened, succulent rootstock producing stolons. Leaves trifid. Flowers axillary, solitary or in leafy terminal inflorescences, ca. 1.5 cm in diam., with pedicels to > 7 cm long; sepals 5, petals 5(–7), bright yellow. Few nutlets per fruit; hooked beaks of nutlets indistinct or distinct.
UL. Grassland; near streams. Common. Flowers in the wet season.

Ranunculus multifidus Forssk.
Herb up to 1 m tall, mostly erect. Leaves basal and cauline, variable in shape and size, bi- or tripinnatisect. Flowers axillary, solitary or in leafy terminal inflorescences, ca. 1.5 cm in diam., with pedicels several cm long; sepal and petals 5, sepals reflexed, petals yellow. Nutlets numerous in spherical heads, with short to well developed beaks.
LL. Wet, shady gullies, along streams. Common. Flowers in the wet season.

Ranunculus simensis Fresen.
Erect or ascending herb to ca. 25 tall, with tufted rootstock. Leaves very much dissected, with ± linear segments. Flowers few together or solitary, on pedicels > 10 cm long, ca. 2.5 cm in diam.; sepals 5, petals 8-12, yellow. Nutlets with ± straight to hooked beaks.
LL. Wet grassland; along streams. Rare. Flowering season unknown.
Note. Endemic to the Ethiopian mountains.

Ranunculus tembensis Fresen.
Habit as above, but leaf segments much wider, 3–5-lobed. Flowers solitary, arising from the base of the plant or from the leafy stem, on pedicels > 15 cm long, ca. 1.5–2 cm in diam.; sepals 5, petals 10 or more, yellow. Nutlets with relatively long hooked beaks.
UL. Damp areas. Rare. Flowering season unknown.
Note. Endemic to the Simen and the Bale Mountains.

Delphinium dasycaulon Fresen.
Perennial to 1 m tall with solitary stem. Leaves divided into 3–5 segments, variable in size. Flowers to ca. 3 cm in diam., spurred, in terminal inflorescence. Outer perianth segments petaloid, showy, deep blue, the posterior forming the spur (< 1 cm long); inner perianth segments small, cream. Fruits typically with 3 follicles.
LL. Open areas in forest. Rare. Flowers in the wet season.

Fig. D2. – A-D, Ranunculus *spp.; A-B,* R. oreophytus, *A, habit with* Limosella major *(on the right, in water) and* Alchemilla *(left and below), B, plant dug out to show tuberous roots; C,* R. stagnalis, *habit; D, R. multifidus, habit. – E,* Delphinium dayscaulon, *inflorescence and flowers.*

MENISPERMACEAE (11)

Dioecious woody or herbaceous climbers (rarely erect shrubs or small trees; not in the Simen). Leaves alternate, simple, sometimes peltate, without stipules. Flowers regular, sepals 3–12, free or united; petals 1–6 or absent; male flowers: stamens 3–6 or indefinite, rarely 2, free or united; female flowers: staminodes present or absent; carpels 3–6 or more, rarely 1, free. Fruits drupaceous; mesocarp pulpy, endocarp often chartaceous or bony.

Stephania abyssinica (Dill. & A.Rich.) Walp.

Twining liana, woody at base. Leaves peltate, blades ovate to suborbicular, up to 13 x 12 cm, thin, slightly discolorous. Flowers in umbel-like cymes, greenish; male with 6 sepals and 3 petals, female with 4 sepals and 3 petals. Drupe sub-spherical-flattened, < 1 cm long.

LL. Scrub, secondary forest. Common. Flowers in the wet season.

PIPERACEAE (15)

Herbs, often epiphytic (occasionally shrubs or small trees or lianas; not in the Simen). Leaves alternate, opposite or whorled, simple. Stipules absent (or present; not in the Simen). Inflorescence a dense spike of minute flowers. Flowers bisexual, sometimes unisexual or polygamous, very small. Perianth absent. Stamens (1-)2–6(-10), free. Ovary superior, 1-chambered with 1 ovule. Fruit indehiscent, fleshy or sticky.

Peperomia abyssinica Miq.

Succulent epiphytic herb to ca. 20 cm tall; stems ascending, rooting at lower nodes. Leaves alternate, petiolate, lanceolate-elliptic, to broadly elliptic, fleshy, to ca. 8 cm long. Spikes terminal or leaf-opposed, solitary, usually < 10 cm long. Fruit spherical-ovoid, < 1 mm long.

LL, (UL). Montane forest; shady wooded gullies; often on mossy tree trunks. Common. Flowers in the wet and dry season.

PAPAVERACEAE (including Fumariaceae) (16)

Herbs, often with milky or yellow latex or with watery sap. Leaves alternate, sometimes prickly (not in the Simen), without stipules, sometimes pinnately lobed or pinnatisect (*Fumaria*). Flowers regular (*Papaver*) or irregular (*Fumaria*), bisexual, mostly solitary and showy (*Papaver*) or in several- to many-flowered inflorescences (*Fumaria*). Sepals 2, often falling quickly. Petals 2+2, free, the outer ones spurred in *Fumaria*. Stamens 6 (*Fumaria*) to numerous (*Papaver*). Ovary superior, with 1 to many ovules. Fruit a many-seeded capsule, sometimes opening with pores (*Papaver*) or a 1-seeded nutlet (*Fumaria*).

Two introduced weeds were noted in the Simen area: *Papaver rhoeas* L., the poppy (occasionally at the edge of cultivations in the Uplands) and *Argemone mexicana* L. (common in abandoned fields in the Lowlands).

Fumaria abyssinica Hamm.

A tufted or straggling herb to ca. 40 cm tall. Leaves 2–3 pinnatisect; leaflets oblong-lanceolate to linear-lanceolate. Flowers 10–20 in dense racemes, pink with a dark pink to purple tip; upper petals with a short basal spur, the inner straight, the lower ones spathulate. Nutlet subrotund, ± rugose when dry.

UL. Grassland. Rare. Flowers in the wet season.

CAPPARACEAE (19)

Plants woody (or sometimes herbaceous; not in the Simen). Leaves alternate, simple (*Capparis*) or digitately compound (*Ritchiea*). Flowers regular (or irregular; not in the Simen). Petals 4, free. Stamens many (in the Simen). Ovary superior, 1-locular, stalked ('gynophor'); stigma minute. Fruit capsular, opening by means of valves (*Ritchiea*), or a berry (*Capparis*).

Fig. D3. – A, Stephania abyssinica, *female flower buds and immature fruits; B-C,* Peperomia abyssinica, *B, on moss-covered tree trunk, C, hanging from rock.*

A

B

C

Capparis tomentosa Lam.
Scrambling shrub, several m tall, forming thickets; branches with recurved stipular thorns. Leaves simple, oblong or broadly elliptic, to ca. 5 cm long. Flowers showy, large (ca. 3 cm in diam.), sweetly scented, in terminal corymbs; petals white, turning pinkish with age; stamens numerous, showy, with whitish-pink, long filaments. Spherical berries orange-red at maturity, to ca. 5 cm in diam., on apically curved, hardened gynophor; seeds compressed, numerous.
LL. Scrub; forest margins. Common. Flowers in the dry and wet season.

Ritchiea albersii Gilg
Unarmed small tree to ca. 4 m tall with densely lenticellate, drooping young branches. Leaves 3–5-foliate; leaflets elliptic, membranous. Inflorescence corymbose, terminal on leafy lateral branchlets. Flowers (pale green to) white, fading yellowish, petals to 3.5 cm long; stamens numerous, as long as petals, filaments white. Fruit ellipsoid or ovoid, with 4 coriaceous valves, on thickened woody gynophore to ca. 3.5 cm long; seeds rounded.
LL. Edge of forest. Uncommon. Flowers in the wet season.

BRASSICACEAE (CRUCIFERAE) (20)
Herbs (in the Simen), often with a basal leaf rosette. Leaves alternate, entire or variously divided, without stipules. Inflorescence a terminal raceme, often ± condensed and corymb-like at anthesis but elongating in fruit, mostly without bracts. Flowers regular; sepals 4, free; petals 4, free, arranged in the form of a cross; stamens 6, 4 long and 2 short. Ovary superior. Fruit a bivalved dehiscent siliqua or silicula (> 3 times or < 3 times as long as wide, respectively); seeds (with well developed cotyledons) remaining on the persistent septum.

1 Herbs not forming distinct rosettes 2
Rosette-forming herbs 6

2 Annual, smelling of garlic; fruits obovate, < 3 times as long as wide (i. e. a silicula) .. *Thlapsi alliaceum*
Annual or perennial, not smelling of garlic; fruits > 3 times as long as wide (i. e. a siliqua) 3

3 Perennial, all parts covered with stellate hairs ..... *Arabis alpina*
Annual or perennial, glabrous or covered with simple hairs ..... 4 (*Cardamine*)

4 Perennial with creeping rhizomes; petals > 3 mm long, showy ..... *Cardamine obliqua*
Annual, without rhizomes; petals < 3 mm long 5

5 Petals shorter than sepals; fruits with scattered hairs ..... *Cardamine trichocarpa*
Petals longer than sepals; fruits smooth ..... *Cardamine hirsuta*

6 Fruits > 3 times as long as wide (i. e. a siliqua); ovaries ± cylindrical 7
Fruits < 3 times as long as wide (i. e. a silicula); ovaries ± ovoid 8

7 Leaves broadly pinnatifid to pinnatisect, all in basal rosette; racemes concealed within rosette ..... *Oreophyton falcatum*
Leaves spathulate to elliptic, serrulate to entire, in basal rosette but some also on the stems; racemes not hidden between rosette ..... *Arabis thaliana*

8 Rosette leaves pinnatipartite to undivided and coarsely toothed; fruits obcordate-triangular ..... *Capsella bursa-pastoris*
Rosette leaves with entire margins; fruits ellipsoid to orbicular 9

9 Leaves linear, to ca. 80 x 2 mm; racemes simple, erect, few-flowered ..... *Subularia monticola*
Leaves elliptic, to 10 x 4 mm; racemes several, branched ..... *Erophila verna* subsp. *macrosperma*

Thlapsi alliaceum L.
Annual with distinct garlic smell; variable in growth form, either prostrate to ascending with numerous branches and only a few cm tall, or (uncommonly) erect, unbranched and much taller. Leaves obovate to elliptic, margins distantly toothed or entire, to 5 cm long. Flowers white. Fruits obovate, dorso-ventrally compressed, to ca. 1 cm long.
UL. Open, bare-soiled places in high altitude grassland; solifluction areas. Uncommon. Flowers in the wet season.

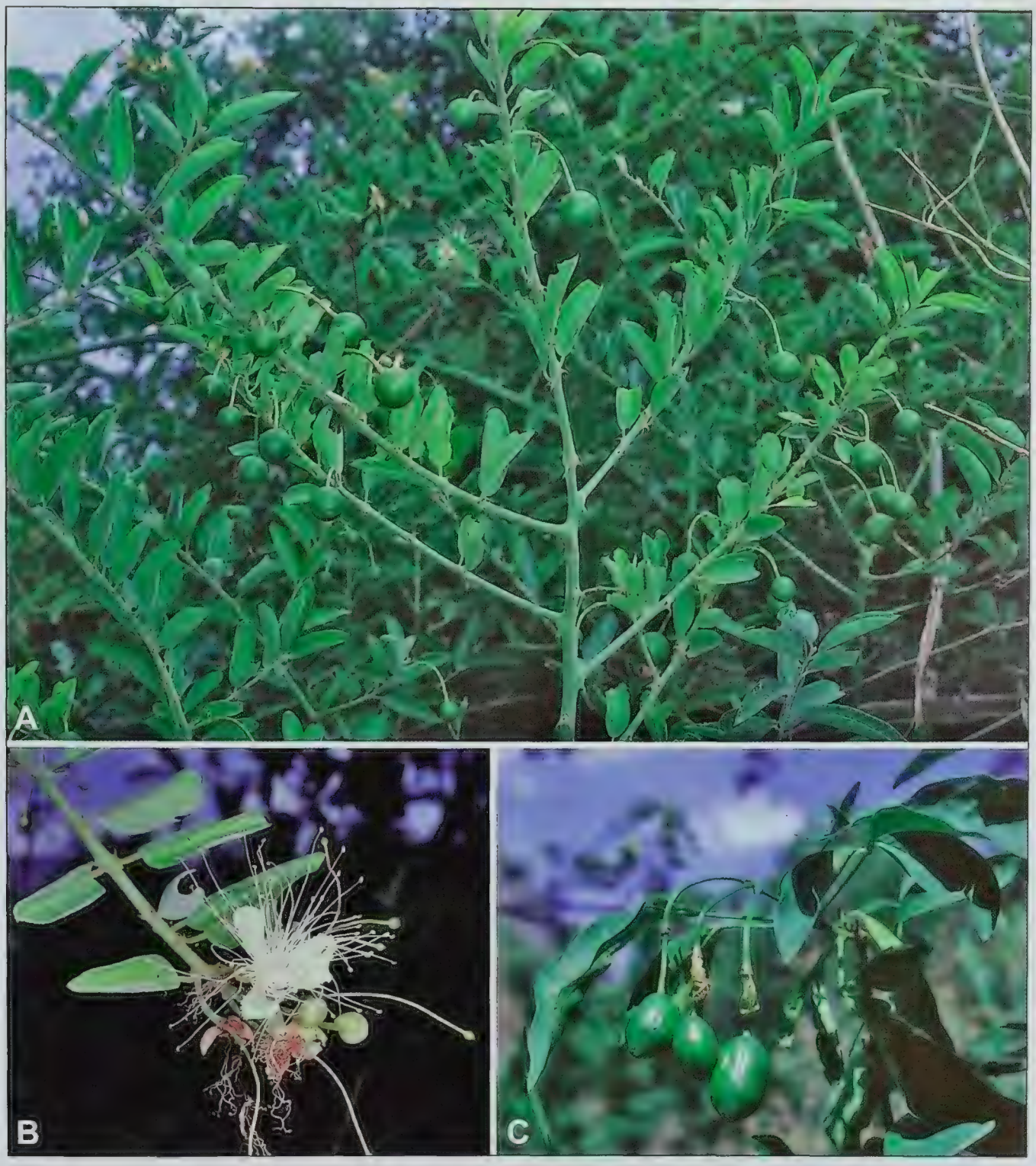


Fig. D4. – A-B, Capparis tomentosa, *A, with immature fruits, B, open flower blooming at night and remnants of previous nights' flowers. – C,* Ritchiea albersii, *immature fruits.*

Capsella bursa-pastoris (L.) Medic.
Erect annual herb to ca. 30 cm tall. Rosette leaves petiolate, pinnatipartite to undivided and coarsely toothed, ca. 3-10 cm long; stem leaves few, smaller, subsessile, sagittate and clasping. Flowers white, small. Fruits obcordate-triangular, dorso-ventrally compressed, to ca. 1 cm long and wide.

UL. Weed in open, disturbed places; around villages and cultivations. Uncommon. Flowers in the wet season.

Subularia monticola Schweinf.
Short-lived stem-less herb with numerous linear, rather fleshy leaves in basal rosette. The latter often longer than, and somewhat hiding, the racemes. Flowers white, minute. Fruits ellipsoid to ovoid, < 1 cm long.
UL. In pools and bogs; along streams. Uncommon. Flowers in the wet season.

Erophila verna (L.) F.Chev. subsp. **macrosperma** (Sebald) Jonsell
Small hairy annual herb only to ca. 5 cm tall, with numerous stems arising from a basal leaf rosette. Flowers very small; petals white, deeply bifid, not much longer than the ovate-lanceolate sepals. Fruit slightly inflated, ovoid, < 5 mm long.
UL. Open, bare-soiled places in high altitude grassland. Rare. Flowers in the wet season.
Note. Endemic to Ethiopia; subsp. *spathulata* occurs in N and C Europe.

Cardamine obliqua A.Rich.
Perennial herb with creeping rhizomes and ascending to erect stems ca. 10–50 cm tall. Leaves pinnate, with 2–6 pairs of lateral leaflets, to ca. 15 cm long. Flowers lilac or violet, seldom whitish, petals to 1 cm long. Fruit linear, ca.1.5–6 cm long, glabrous.
UL. Wet areas in grassland, along streams. Common. Flowers in the wet season.

Cardamine trichocarpa A.Rich.
Annual herb, usually < ½ m tall. Leaves pinnate, with 1–5 pairs of lateral leaflets, to ca. 15 cm long. Flowers very small and inconspicuous; sepals to 2 mm long, petals white, shorter than sepals or absent. Fruit linear, ca 1–2.5 cm long, with scattered hairs.
UL. Moist places in grassland. Locally common. Flowers in the wet season.

Cardamine hirsuta L.
Annual or short-lived perennial herb to 30 cm tall. Leaves pinnate, with 2–6 pairs of lateral leaflets, to ca. 10 cm long, mostly crowded near stem base. Flowers small and inconspicuous; petal white, to ca. 3 mm long, longer than sepals. Fruit linear, ca 1–2.5 cm long, glabrous.
UL. Open areas in wet grassland. Uncommon. Flowers in the wet season.

Arabis alpina L.
Perennial herb forming loose tufts or mats, to ca. 50 cm tall; stems and leaves appearing silvery due to dense cover with stellate hairs. Leaves spathulate to oblong, toothed, the largest to 7 cm long; basal ones petioled, upper ones sessile and clasping. Flowers white, petals to ca. 1.5 cm long. Fruit linear, often ± curved and slightly beaded, to ca. 5 cm long.
ESC, **UL**. Amongst rocks, often in ± shady and damp situations. Common. Flowers in the wet and dry season.

Arabis thaliana L. [syn. *Arabidopsis thaliana* (L.) Heynh.]
Annual or short-lived perennial herb to 25 cm tall, branched from the base. Basal leaves in dense rosette, sessile, spathulate to elliptic, to 4 x 1 cm; stem leaves spaced out, much smaller, not clasping. Flowers white, small, petals only to ca. 3 mm long. Fruit linear, to 2 cm long.
ESC, **UL**. Moist, open areas in grassland. Common. Flowers in the wet and dry season.

Oreophyton falcatum (A.Rich.) O.E.Schulz
Perennial herb with ± thick tap root forming acaulescent rosettes. Leaves to 5 cm long, often somewhat longer than racemes. Flowers white to light violet, small, petals to ca. 6 mm long. Fruit usually ± curved, to 3.5 cm long.
UL. Open, bare-soiled places at the highest altitudes; solifluction terraces between boulders. Uncommon. Flowers in the wet season.

Fig. D5. – A, Erophila verna *subsp.* macrosperma. *– B-C,* Cardamine obliqua, *B, 'normal' form in wet area, C, stunted high altitude form. – D,* Arabis alpina. *– E,* Oreophyton falcatum.

A
B
C
D

VIOLACEAE (22)

Herbs with alternate, stipulate leaves (in the Simen). Flowers irregular, bisexual, with 5 free sepals, petals and stamens (in the Simen). Ovary superior, 1-chambered. Fruit a many-seeded capsule.

Viola abyssinica Steud. ex Oliv.

Trailing perennial herb, often rooting at nodes. Leaves broadly ovate to ovate-cordate, to 4 x 3 cm; stipules leaf-like, ovate to lanceolate, prominently toothed/divided, to ca. 1 cm long. Flowers long pedunculate/pedicellate, solitary in leaf axils, bilateral, ca. 1 cm in diam. Petals pale blue to violet-blue. Capsule < 1 cm long, splitting into 3 valves.

(LL), **UL**. Rocky grassland; along streams; usually in ± shady locations. Uncommon. Flowers in the wet season.

POLYGALACEAE (24)

Herbs, sometimes woody at the base, with alternate leaves lacking stipules (in the Simen). Inflorescences axillary or terminal racemes. Flowers bilaterally symmetrical. Sepals 5, 2 often enlarged and petaloid; petals 3–5, the lowermost usually enlarged to form a keel, often with a brush-like appendage. Stamens 5–8, filaments united into a sheath. Ovary superior, 1–2-locular. Fruit a capsule (in the Simen).

1 All inflorescences axillary (never leaf-opposed or terminal) 2
Inflorescences terminal or leaf-opposed 3

2 Leaves 1.5–4 mm wide; lateral, enlarged sepals ("wings") whitish, with distinct green central stripe ..... *Polygala erioptera*
Leaves 15–20 mm wide; lateral, enlarged sepals uniformly greenish-white ..... *Polygala sadebeckiana*

3 Inflorescences mostly leaf-opposed, to 3 cm long ..... *Polygala steudneri*
Inflorescences terminal, to 20 cm long ..... *Polygala abyssinica*, *P. rupicola*

Polygala erioptera DC.

Variable herb with oblong-elliptic leaves to 40 x 4 mm. Racemes congested, only to 1 cm long. Lateral, enlarged sepals to 5 mm long; keel pinkish-purple.

UL. Rocky grassland. Uncommon. Flowers in the wet and dry season.

Polygala sadebeckiana Gürke

Perennial herb to 15 cm, branching from the base. Leaves elliptic, ca. 30–40 x 15–20 mm. Racemes congested, only to 1 cm long. Lateral, enlarged sepals to 7 mm long; keel pinkish.

LL. Bushland. Rare. Flowers in the dry season.

Polygala steudneri Chod.

Woody-based herb to ca. ½ m tall. Leaves elliptic, ca. 5–15 x 2.5–5 mm. Racemes only up to 3 cm long. Lateral, enlarged sepals white or pale pink, with magenta veins, to ca. 6 mm long; keel longer than enlarged sepals, purplish-pink.

UL. Open grassy areas. Uncommon. Flowers in the wet season.

Polygala abyssinica Fresen.

Growth form as above, but leaves linear-elliptic and longer (to > 40 mm). Racemes to 20 cm long. Lateral, enlarged sepals white with prominent purple or green veins, to ca. 8 mm long; keel as long as enlarged sepals, reddish-purplish.

LL, **UL**. Rocky, grassy slopes. Uncommon. Flowers in the wet season.

Polygala rupicola A.Rich.

Very close to and possibly only an ecotype of *P. abyssinica*. Distinguished by shorter leaves (to ca. 20 mm) and shorter inflorescences (to 10 cm).

LL, **UL**. In cracks of rocks in exposed site. Rare. Flowers in the wet season.

Fig. D6. – A-B, Viola abyssinica, *A, habit, B, flower.*

CARYOPHYLLACEAE (28)

Herbs or subshrubs with simple entire opposite leaves, mostly without stipules. Flowers mostly 4–5-merous, regular. Sepals free or united. Petals free, tips often deeply cleft. Stamens usually twice as many as petals, in 2 whorls,. Ovary superior, 1-chambered, with numerous ovules; styles 2–5, free or united. Fruit capsule, opening by means of valves or teeth at the tip.

1 Stipules absent 2
Stipules present 12

2 Delicate annual with 1-seeded fruits enclosed in hardened receptacle tube ..... *Scleranthus annuus*
Annual or perennial with many-seeded capsules; receptacle not produced into a tube 3

3 Sepals free 4
Sepals fused into a calyx tube, as least in the lower half 8

4 Leaves linear to subulate or needle-like 5
Leaves wider 6

5 Mat-forming perennial with needle-like leaves < 1 mm wide, mostly growing in rock crevices ..... *Minuartia filifolia*
Tussock- or cushion-forming perennial with linear to subulate leaves to ca. 2 mm wide, growing in wet to moist places ..... *Sagina abyssinica*, *S. afroalpina*

6 Leaves with distinct petioles, to > 2 cm long; styles 3 ..... *Stellaria sennii*
Leaves ± sessile; styles 4–5 ..... 7 (*Cerastium*)

7 Petals longer than sepals; capsule teeth recurved ..... *Cerastium afromontanum*
Petals not longer than sepals; capsule teeth straight ..... *Cerastium octandrum*

8 Calyx tube subtended by 3 pairs of bracts ..... *Dianthus longiglumis*
Calyx tube not subtended by bracts 9

9 Delicate herbs with minute flowers and a small calyx (only to ca. 7 mm long) ..... *Uebelinia abyssinica*
More robust perennial with larger flowers and a long, conspicuous calyx tube (> 1 cm long) 9 (*Silene*)

10 Plants woody at base; calyx ca. 3–4 cm long ..... *Silene macrosolen*
Plant not woody at base; calyx shorter 11

11 Pedicels much longer than calyx ..... *Silene flammulifolia*
Pedicels shorter than calyx ..... *Silene burchellii*

12 Plants forming dense moss-like tussocks to 3 cm tall; inflorescences hidden by large silvery scarious bracts; fruits completely hidden by sepals ..... *Paronychia bryoides*
Prostrate, not tussock-forming herb; flower clusters not concealed by bracts ..... *Herniaria abyssinica*

Herniaria abyssinica Chaudhri
Perennial with woody taproot and prostrate branches to 10 cm long. Leaves to 5 mm long. Flowers minute (ca. 2 mm wide), in axillary clusters of 3–6. Fruit as long as sepals.
UL. Grassland with *Helichrysum citrispinum* bushes. Rare. Flowering season unknown.
Note. Only known from few collections. Endemic to the Simen and the Bale Mountains.

Paronychia bryoides A.Rich.
Perennial forming moss-like cushions. Leaves closely spaced and overlapping, adpressed to the stem, to 5 mm long; stipules almost as long as leaves. Minute sessile flowers in terminal clusters; petals dark brown, < 1 mm long.
UL. In cracks of rocks. Rare. Flowering season unknown.
Note. Endemic to Simen.

Minuartia filifolia (Forssk.) Mattf.
Mat-forming perennial with woody base; stems to 30 cm long. Needle-like leaves to ca 1.5 cm long, mostly clustered on contracted lateral shoots. Flowers pedicellate, white, 6 to more in inflorescences terminal on leafy branches; sepals and petals ca. 5 mm long. Capsule splitting into 3 valves.
UL. Mostly in cracks of rocks in open, sunny areas. Common. Flowers in the dry season.

Sagina abyssinica Hochst. ex A.Rich. subsp. **abyssinica**
Perennial forming dense tussocks or cushions with branches to ca. 10 cm long. Leaves linear to subulate, 1–3 cm long. Flowers in dichasial cymes or solitary. Petals well developed, white, to ca. 5 mm long. Capsules splitting into 5 valves.
UL. Moist to wet open places. Common. Flowers in the wet season.
Note. The subspecies is endemic to the Ethiopian high mountains.

Sagina afroalpina Hedberg
Similar to the above in most respects, but often forming denser cushions and differing in having flowers without petals.
UL. Wet places, often in shallow water. Uncommon. Flowers in the wet season.

Cerastium afromontanum T.C.E.Fr.
Sprawling herb with ± sessile, ovate to lanceolate leaves ca. 2–3 cm long. Flowers in few-flowered cymes and/or solitary, white. Petals distinctly longer than sepals, to ca. 1 cm long, shallowly emarginated at apex. Capsule to ca. 1 cm long, its teeth recurved.
LL, **UL**. Open bush- or scrubland; *Erica* forest. Common. Flowers in the wet season.

Cerastium octandrum Hochst. ex A.Rich. var. **octandrum**
Polymorphic sprawling herb with stems to 40 cm long. Leaves sessile, ovate to elliptic, variable in size. Flowers in dichasial cymes, white. Petals slightly shorter than or ± as long as sepals, ca. 0.5 cm long, with a deep narrow notch at the tip. Capsule to ca. 1.5 cm long, its teeth straight.
UL. Moist to wet, ± disturbed sites. Common. Flowers in the dry season.

Stellaria sennii Chiov.
Prostrate to ± ascending herb with stems to 1 m long. Leaves with distinct petioles, blades broadly ovate, cordate at base. Flowers pedicellate, solitary in leaf axils, 4-merous. Petals absent or shorter than sepals. Capsule with 4 acuminate teeth.
LL. Damp forest margins. Uncommon. Flowers in the wet season.

Fig. D7. – A-B, Minuartia filifolia, *A, with flowering* Cyanotis *(top); B, detail, with* Crassula schimperiana *in left foreground. – C,* Sagina afroalpina, *habit (match as scale). – D,* Cerastium afromontanum, *habit.*

A
B
C
D

Uebelinia abyssinica Hochst.
Often ± erect herb with obovate to elliptic, ± sessile leaves to ca. 2.5 cm long. Flowers in distinct cymes, ± sessile to distinctly pedicellate, white. Petals shorter than sepals.
LL, **UL**. Mostly in ± moist, disturbed places. Common. Flowers in wet season.

Silene macrosolen Steud. ex A.Rich.
Perennial herb, woody at base and with long ± woody tap root, sometimes ± cushion-forming. Stems to ca. 50 cm long. Leaves linear to oblong-lanceolate, to ca. 7 cm long. Inflorescences laxly several- to 1-flowered. Flowers on pedicels to > 5 cm long, white or pinkish with reddish veins, ca. 2.5–3 cm in diam. Calyx club-shaped, ca. 3–4 cm long; petal-limbs deeply emarginate. Capsule ca. 1.5 cm long, slightly exserted from calyx tube.
ESC, **UL**. Steep rocky slopes, in pockets of soil or in cracks of rocks. Uncommon. Flowers in the dry season.

Silene flammulifolia A.Rich.
Perennial herb with lax and trailing stems (in shade) or more compact and with leaf rosette (in sun). Leaves oblanceolate, to 5 x 0.5 cm. Cymes few- to 1-flowered, pedicels longer than the ca. 1 cm long calyx. Petal-limbs deeply bifid, white at first, becoming pink to deep red with age. Flowers > 2 cm in diam.
UL. Exposed cliffs; in cracks of rocks. Rare. Flowers in the dry season.
Note. Only known from the northern Ethiopian highlands and from the mountains of Somalia and Yemen.

Silene burchellii DC.
Perennial herb to ca. 20 cm with hairy linear to oblong-lanceolate leaves to ca. 3 cm long. Flowers several in one-sided, raceme-like inflorescences; pedicels distinctly shorter than the club-shaped calyx (ca. 1–2 cm long). Petal-limbs deeply notched, (creamy-)white, fading to pink or purplish with age. Flowers < 2 cm in diam.
LL, **UL**. Rocky slopes; grassland. Uncommon. Flowers in the wet season.

Dianthus longiglumis Del.
Pendent, many-stemmed perennial herb with woody base or subshrub, glabrous throughout. Leaves congested near stem tips, linear-falcate, 8–12 cm long. Inflorescence terminal, to 35 cm long, curving upwards, 3–1-flowered. Calyx ca. 5 cm long, subtended by 3 pairs of bracts with acuminate tips. Petal-limbs rounded and coarsely dentate, pale pink to white. Flowers ca. 4 cm in diam.
UL. On vertical cliff faces. Rare. Flowers in the dry season.
Note. Only known from the Simen and the mountains of South Yemen.

AIZOACEAE (including Mesembryanthemaceae and Tetragoniaceae) (31)
At least slightly succulent, often very succulent herbs or subshrubs. Leaves simple, opposite (in the Simen), without stipules. Flowers regular, in cymes or solitary. Perianth with sepals and petal-like staminodes (in the Simen). Stamens numerous and ovary superior, 5-chambered (in the Simen). Fruit capsular.

Delosperma abyssinica (Regel) Schwantes
Prostrate mat-forming subshrub with short stems rooting at the nodes and subcylindrical, succulent leaves. Flowers terminal, solitary, with numerous pink to purplish petaloid staminodes and yellow stamens; sepals 5, fleshy. Fruit a 5-valved capsule.
LL. Dry rocky areas. Rare. Flowers at the beginning of the wet season.
Note. New record for the Simen; only seen in the Mesheha valley. The genus has previously been included in Mesembryanthemaceae.

Fig. D8. – A-E, Silene *spp.; A-B,* S. macrosolen, *A, dug up plant with tap root; C-D,* S. flammulifolia; *E,* S. burchellii. – *F,* Dianthus longiglumis. – *G,* Delosperma abyssinica.

A
B
C
D
E
F
G

PORTULACACEAE (32)
Succulent herbs with simple, entire alternate or opposite leaves without stipules (in the Simen). Flowers in cymes or sometimes solitary flowers, regular. Sepals 2, petals typically 4–5, free or partly united; stamens few to numerous. Ovary superior to partly inferior, 1-chambered, stigmas 3–6. Fruit a circumsessile capsule ('lid-capsule'; in the Simen).

Portulaca oleracea L. subsp. **oleracea**
Fleshy herb with spreading or prostrate stems to ca. 25 cm long. Leaves alternate to subopposite, obovate-spathulate, to ca. 3 x 1 cm. Flowers dull yellow, to ca. 2 cm in diam., few together within an involucre of leaf-like bracts. Ovoid lid-capsule with many black seeds.
LL. Cracks of rocks, dry places in ± disturbed areas. Rare. Flowers in the wet season.

PHYTOLACCACEAE (35)
Trees, shrubs or herbs, erect or scrambling. Leaves simple, entire, alternate, without stipules. Flowers small, regular, bisexual, sometimes dimorphic, or unisexual, in racemes, spikes or panicles. Sepals usually 4-5, petals generally absent. Stamens few to many. Ovary superior, with few to many free or united 1-ovulate carpels. Fruits fleshy (in the Simen).

Phytolacca dodecandra L'Hér.
Semi-succulent straggling or scrambling shrub with stems to > 10 m long. Leaves with petioles to 4 cm long, blades ovate to broadly elliptic, to 15 x 10 cm. Flowers whitish to yellowish green, either long- or short-staminate, ca. 5 mm in diam., in dense racemes to ca. 30 cm long. Fruit a bluntly star-shaped berry, red-orange when mature, < 1 cm in diam.
LL. Edges of forest or bush- and scrubland. Common. Flowers in the wet season.

AMARANTHACEAE (37)
Herbs with simple opposite leaves without stipules (in the Simen). Flowers very small, mostly regular, in spike- or head-like inflorescences, usually surrounded by dry, chaffy, often spinescent bracts. Sepals 5, free, ± dry and membranous; petals absent. Stamens 5, opposite sepals. Ovary superior, 1-chambered. Fruit capsular.

Cyathula cylindrica Moq.
Erect perennial to 1 m tall, sometimes scrambling and with longer stems. Leaves broadly oblong- or elliptic-ovate, very variable in size, the largest > 10 cm long. Inflorescences terminal, cylindrical, to > 10 cm long or sometimes much reduced and almost head-like, with fertile flowers (ca. 1.5 cm in diam.) and sterile modified flowers with hooked processes. Crowded clusters of fertile and sterile flowers forming burs ca. 2 cm in diam.
LL. In scrub, forest edges, shady gullies. Uncommon. Flowers in the wet season.

Achyranthes aspera L. var. **aspera**
Erect Perennial to 1 m tall. Leaves petiolate, elliptic to almost round, the largest to ca. 20 cm long. Inflorescences terminal spikes to > 30 cm long. Flowers subtended by narrow, straw-coloured membranous bracts, with narrowly lanceolate tepals ca. ½ cm long, pale green to reddish or purplish. Capsules oblong-ovoid, > ½ cm long.
LL, **UL**. Mostly in disturbed sites. Uncommon. Flowers in the dry and wet season.

POLYGONACEAE (38)
Herbs or sometimes shrubs, stems often with ± swollen nodes. Leaves alternate, simple, entire or pinnately lobed, with sheathing stipules ('ochreas'). Inflorescences raceme-like, with cymose partial inflorescences. Flowers uni- or bisexual, small, regular. Tepals 3 + 3 (in the Simen). Stamens 4–9 (3 + 3 in the Simen). Ovary superior, 1-locular, with 1 ovule. Fruit an often angled or winged nut.

1 Shrub with short-petioled lanceolate leaves with 3 parallel veins ..... *Rumex nervosus*
Perennial herb; leaves not as above 2

Fig. D9. – A-B, Portulaca oleracea, *A, habit, B, flower. – C-D,* Phytolacca dodecandra, *C, fruiting inflorescence, D, fruits. – E-F,* Achyranthes aspera, *E, habit, F, inflorescence with open flower.*

2 Leaves hastate, palmately veined; outer tepals with smooth margins ..... *Rumex abyssinicus*
Leaves lanceolate to elliptic, not hastate; outer tepals with hooked teeth ..... *Rumex nepalensis*

Rumex nepalensis Spreng.

Stout, erect perennial to ca. 1 m tall. Basal leaves large, with petioles to 20 cm long. Inflorescences a terminal panicle, with clusters of flowers hanging down. Flowers usually unisexual. Inner tepals enlarging to ca ½ cm in fruit, enclosing the triangular nutlets.

UL. Disturbed, ± damp places. Common. Flowers in the wet season.

Rumex abyssinicus Jacq.
Perennial with thick, fleshy rhizome; stems stout, to ca. 2 m tall. Leaves hastate, the largest to 25 x 20 cm; petioles often as long as blades. Inflorescence a large, much branched panicle to 40 cm long. Inner tepals as in the previous species but tepal margins smooth.
LL. Secondary scrub, disturbed areas, around fields. Common. Flowers in wet season.

Rumex nervosus Vahl
Shrub to ca. 2 m tall. Leaves leathery to succulent, much smaller than in the previous species. Inflorescence and inner tepals as in *R. abyssinicus*.
(LL), **UL**. Open rocky or gravelly areas. Common. Flowers in the dry season.

LINACEAE (40)
Herbs with simple, alternate or opposite leaves (in the Simen). Flowers regular. Sepals and petals 4–5, free or partially united. Stamens as many as the petals (in the Simen). Ovary superior, 4–5-chambered (in the Simen). Fruit a capsule (in the Simen).

Linum usitatissimum (linseed), an annual with blue to bluish-white flowers, is often cultivated as an oil crop both in the Up- and Lowlands.

Radiola linoides Roth
Minute annual, only a few cm tall, with obovate to elliptic, opposite leaves. Flowers 4-merous, minute, whitish-yellow, in dichasial, corymbose cymes. Capsule 8-valved.
UL. Rocky, grazed grassland. Rare. Flowers in the dry season.

GERANIACEAE (42)
Herbs or small shrubs, with alternate or opposite, stipulate leaves. Leaf blades often pinnately or palmately lobed. Flowers often in umbel-like inflorescences, sometimes solitary, regular or slightly irregular (bilaterally symmetrical in *Pelargonium*), typically 5-merous. Petals free. Stamen twice as many as petals (in the Simen). Ovary superior, 5-lobed (in the Simen); styles joined into a short column, stigmas free. Fruit dry, breaking into 5 mericarps.

1 Leaves pinnately compound ..... *Erodium moschatum*
Leaves not compound, variously lobed 2

2 Flowers bilaterally symmetrical; fruits long-beaked, 5-lobed, splitting into indehiscent mericarps with plumose persistent styles ..... *Pelargonium multibracteatum*
Flowers radially symmetrical; fruits as above, but mericarps dehiscing to eject the seed as the persistent style curls explosively outward ..... 3 (*Geranium*)

3 Stems rough, beset with scattered, sharp, ± reflexed prickles ..... *Geranium aculeolatum*
Stems pubescent or pilose ..... *Geranium arabicum*

Geranium aculeatum Oliv.
Perennial with straggling or trailing stems to > 1 m long, sometimes rooting at the nodes. Leaves opposite, petioles with prickles, blades with 5 rhombic, pinnatifid lobes. Flowers white to pale pink or mauve, ca. 2 cm in diam.
UL. Forest edges; in scrub, along streams. Uncommon. Flowers in the wet season.

Geranium arabicum Forssk.
Perennial, sometimes with a ± woody rootstock. Stems often stoloniferous, sometimes scandent or occasionally forming tufts. Leaves opposite, sometimes in basal rosette; blades palmately divided into 5 ± rhombic lobes. Flowers solitary or in pairs, white to pale pink or lilac with dark purple veins.
Based on leaf blade characters, two subspecies can be distinguished:
Subsp. **arabicum**
Lobes of leaf blade subentire with deeply serrate/dentate margin.
(LL), **UL**. Grassland. Locally common. Flowers in the wet season.
Subsp. **latistipulatum** (A.Rich.) Kokwaro

Fig. D10. – *A-C*, Rumex *spp.*; *A*, R. abyssinicus; *B-C*, R. nervosus. – *D*, Geranium arabicum *subsp.* latistipulatum.

Lobes of leaf blade deeply pinnatisect into narrowly oblong segments separated by wide sinuses.

LL, **ESC**, **UL**. Steep grassy slopes; in *Erica* forest and scrub. Uncommon. Flowers in the wet season.

Erodium moschatum (L.) Ait.
Annual or short-lived perennial herb with musk-like smell; stems ascending, to ca ½ m long. Leaves with several alternate to opposite ovate to elliptic leaflets. Flowers several in ± umbel-like inflorescences, violet to purple or pink, ca. 2 cm in diam. Persistent style ('awn') of mericarp twisted into an elongated spiral.

LL, (UL). Sheltered, moist places between rocks in grazed grassland. Common. Flowers in the wet and dry season.

Pelargonium multibracteatum Hochst. ex A.Rich.
Much-branched, often ± rounded perennial herb to ca. 30 cm tall; both stems and leaves somewhat succulent. Leaves alternate, petiolate; blades round in outline, palmately incised, to ca. 10 cm in diam. Flowers few to several in ± umbel-like inflorescences, white, often with pinkish spots near base of petals, ca. 3–4 cm in diam. Mericarp and plumose persistent style to > 3 cm long.

LL. Rocky slopes, between boulders. Locally common. Flowers in the wet season.

OXALIDACEAE (43)
Herbs with alternate, compound leaves. Flowers regular, 5-merous, sepals and petals free. Stamens 5 short + 5 long. Ovary superior, 5-chambered with 5 free styles. Fruit a capsule.

Oxalis procumbens Steud. ex A.Rich. subsp. **procumbens**
Small perennial herb with branched, creeping stems rooting at nodes. Leaves trifoliolate, leaflets obcordate, ca. ½ cm long, petioles to ca. 3 cm. Flowers mostly solitary in leaf axils, yellow, ca. 1 cm in diam.

UL. Heavily grazed grassland. Uncommon. Flowers in the dry season.

BALSAMINACEAE (45)
Herbs with tubers or rhizomatous rootstocks, often with succulent stems. Leaves spirally arranged, simple. Flowers irregular, showy. Sepals mostly 3, the lower tapering into a conspicuous nectariferous spur. Petals 5, lower ones usually bilobed. Stamens 5, united at base. Ovary superior, 5-chambered. Fruit a fleshy, 5-valved capsule (in the Simen).

Impatiens tinctoria A.Rich.
Perennial herb with large swollen tuberous rootstock at or just below the soil surface and stems to ca. 1.5 m tall. Leaves narrowly ovate, to lanceolate, the largest mostly > 10 cm long. Flowers several together, white, often spotted near base, large (to ca. 5 cm in diam.), spur to > 10 cm long.

UL. Steep rocky places, along streams; moist, shady places. Common. Flowers in the wet season.

Based on spur shape and size, two subspecies (both occurring in similar habitats) can be distinguished:

Subsp. **tinctoria** – spurs 8–12 cm long; lower sepal gradually narrowed into the spur.

Subsp. **abyssinica** (Hook.f.) Grey-Wilson – spurs 3–7 cm long; lower sepal abruptly narrowed into the spur.

Note. Subsp. *abyssinica* is endemic to Ethiopia.

Impatiens hochstetteri Warb. subsp. **hochstetteri**
Annual or perennial herb without tubers; stems erect or procumbent, to ca. 40 cm long. Leaves ovate(-lanceolate) to broadly elliptic, usually < 10 cm long. Flowers solitary or few together, mostly pale pink, ca. 1 cm in diam., spur to ca. 2 cm long. .

LL. Mostly along streams. Common. Flowers in the wet season.

Fig. D11. – A-B, Pelargonium multibracteatum. *– C,* Oxalis procumbens. *– D-I,* Impatiens *spp.; D-G,* I. tinctoria *subsp.* tinctoria, *D, habit, E, flower, F, tubers, G, hands stained from extract obtained from the tubers; H-I,* I. hochstetteri, *H, habit, I, flower.*

A
B
C
D
E
H
F
G
I

LYTHRACEAE (46)
Herbs with decussate, simple, entire leaves (in the Simen). Inflorescences usually cymose, sometimes reduced. Flowers bisexual, regular, normally 4–6 merous. Sepal and petals inserted on a tubular or campanulate receptacle ('hypanthium'). Stamens usually up to twice as many as sepals. Ovary superior. Fruit capsule, often included in persistent hypanthium.

Lythrum rotundifolium A.Rich.
Perennial with creeping or ascending stems to ca. 30 cm long. Leaves obovate to orbicular. Flowers solitary in leaf axils, 4-merous, with cylindrical hypanthium, mauve-blue to purple, ca. 1 cm in diam.
LL. Swamps, along streams; always in wet places. Rare. Flowers in the dry season.

ONAGRACEAE (49)
Herbs with alternate or opposite simple leaves (in the Simen). Flowers solitary or in more-flowered inflorescences, regular, mostly 4-merous, petals free. Stamens as many or twice as many as sepals. Ovary inferior, 4-chambered; style 4-lobed. Fruits capsular.

Epilobium hirsutum L.
Robust rhizomatous herbs with erect stems to ca. 1.5 m tall. Leaves oblong-lanceolate, sessile, to ca. 10 cm long, leaf bases clasping the stem. Flowers in leafy racemes, pink to purple, to ca. 3 cm in diam.; stigma deeply 4-lobed. Fruits elongated, 4-valved capsules to ca. 8 cm long, releasing seeds with hair tufts.
LL. Wet places by rivers, along swamps. Uncommon. Flowers in the wet season.

Epilobium stereophyllum Fresen. var. **stereophyllum**
Stoloniferous perennial to c. 1 m tall. Leaves ovate to ovate-lanceolate, shortly petiolate, to ca. 5 cm long, not clasping the stem. Flowers and fruits similar to the above, but stigma ± entire and clavate.
LL, **UL**. Moist to wet areas along streams; bogs. Common. Flowers in the wet season.

PROTEACEAE (55)
Trees or shrubs with alternate, simple, entire leathery leaves (in the Simen). Flowers irregular, in terminal involucrate heads (*Protea*) or in spikes (*Faurea*) or racemes. Perianth undifferentiated, with 4 tepals. Stamens 4, opposite and fused to the tepals. Ovary superior,1-chambered. Style long, often exceeding perianth, variously modified distally into a filiform to expanded pollen-presenter. Fruit a nut (in the Simen).

Faurea speciosa Welw.
Small to medium sized tree, to 10 m tall. Leaves lanceolate, to ca. 10 cm long. Many-flowered spikes to ca. 10 cm long. Flowers reddish, ca. 1 cm long.
LL. Bushland, wooded grassland. Rare. Flowers in the dry season.

Protea gaguedi J.F.Gmel.
Small tree to c. 4 m tall. Leaves lanceolate to narrowly oblanceolate, to ca. 15 cm long. Head-like inflorescences to ca. 10 cm in diam., subtended by an involucre of large bracts. Flowers (creamy-)white. Nut densely hairy, topped by persistent style.
LL. Secondary forest, scrub. Uncommon. Flowers in the wet season.

FLACOURTIACEAE (59)
Trees or shrubs with alternate, simple, stipulate leaves. Flowers bi- or unisexual. Sepals and petals free, normally 3–7, the latter sometimes absent. Stamens 5 to many. Ovary superior, 1-chambered. Fruit a fleshy berry (in the Simen).

Fig. D12. – A, Lythrum rotundifolium. *– B-D,* Epilobium *spp.; B-C,* E. hirsutum*; D,* E. stereophyllum. *– E,* Faurea speciosa*, buds, flowers, young fruits (left to right). – F-G,* Protea gaguedi.

A

B

C

D

E

F

G

Dovyalis abyssinica (A.Rich.) Warb.
Dioecious shrub or a small tree to c. 3 m tall, branches usually with woody thorns. Leaves ovate to elliptic, to ca. 8 cm long. Flowers lacking petals, sepals greenish to greenish-yellow, spreading, ca. 1 cm in diam. Male flowers with many stamens, in 1–3-flowered inflorescences. Female flowers usually solitary; ovary with (4-)5 filiform styles. Fruit a yellow(-orange) berry to ca. 2 cm in diam.

LL. In forest remnants; riverine forest; as solitary tree in farmland. Locally common. Flowers in the wet season.

CUCURBITACEAE (65)
Dioecious climbing herbs with tendrils and alternate simple leaves (in the Simen). Flowers 5-merous, regular, unisexual, axillary. Sepals free, petals united. Stamens variously united. Ovary inferior, comprised of 2–3 united carpels. Fruit a berry, often with thick skin, sometimes splitting open when fully mature.

Zehneria scabra (L.f.) Sond.
Dioecious climber with stems several m long and simple tendrils. Leaves (broadly) ovate or pentagonal, margin usually palmately 3–5-lobed, to ca. 10 cm long. Flowers in sessile (female) or ± stalked (male) subumbel-like clusters of few to several, white (turning cream and yellowish with age). Fruit a ± globose berry ca. 1 cm in diam., red when fully mature.

LL, **UL**. Edge of forest remnants; in scrub; in *Hypericum revolutum* stands. Common. Flowers in the dry season.

Momordica foetida Schumach.
Dioecious, unpleasant-smelling trailing or climbing herb with stems to several m long and simple or bifid tendrils. Leaves (broadly) ovate with cordate base and sinuate-denticulate margin, to > 15 cm long. Male flowers 1–several in pedunculate clusters, female flowers solitary, on pedicels to > 10 cm long. Corolla pale yellow. Fruit ellipsoid, densely softly spiny, to ca. 7 cm long, orange when fully mature and eventually dehiscent into 3 valves, revealing red pulp in which the black seeds are embedded.

LL. Edge of forest remnants and thickets. Uncommon. Flowers in the wet season.

MYRTACEAE (72)
Trees or shrubs with usually opposite leaves without stipules. Inflorescences terminal, cymose panicles (in the Simen). Flowers 4–5-merous, regular, with a ± bell-shaped hypanthium and numerous stamens; sepals and petals free. Ovary inferior. Fruit a capsule, drupe or berry.

Eucalyptus globulus is grown in the Simen Uplands (primarily in Gich village) and around some villages in the Lowlands. This Australian species has been introduced to Ethiopia more than 100 years ago and is widely planted in the country as a timber tree. Older trees, to ca. 30 m tall, are mostly seen in Gich village and – in the Lowlands – in Truwata village. More commonly, relatively young trees are encountered. Its leaves are highly dimorphic; juvenile leaves are grey-green to glaucous, sessile, ovate with a cordate base which is clasping the stem; adult leaves are green, have a distinct petiole and are (narrowly) lanceolate.

Syzygium guineense (Willd.) DC. subsp. **guineense**
Tree to ca. 15 m tall. Leaves lanceolate or elliptic-ovate, to ca. 10 cm long. Flowers in terminal panicles, white, sweetly scented. Berry ± globular, ca. 1 cm in diam., dark purplish-blue.

LL. Along small streams; as solitary trees in farmland. Common. Flowers in the wet season.

Fig. D13. – A-B, Dovyalis abyssinica, *A, thorny branch with female flowers, B, very young fruit. – C-D,* Momordica foetida, *C, closed (right) and dehisced fruit, D, open fruit to show red pulp with included (black) seeds. – E-F,* Syzygium guineense, *E, part of crown, F, flowers.*

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COMBRETACEAE (75)

Shrubs or trees (in the Simen) with opposite, whorled or alternate, simple leaves without stipules. Flowers in spikes (in the Simen), usually bisexual, small, regular, with a conspicuous receptacle tube, 4–5-merous; petals sometimes absent (*Terminalia*). Stamens twice as many as the sepals, exserted from the receptacle (in the Simen). Ovary surrounded by receptacle tube, 1-locular. Fruits indehiscent, 1-seeded, dry and winged (in the Simen).

Combretum molle R.Br. ex G.Don

Tree to ca. 7 m tall, with grey to brown or blackish fissured bark. Leaves opposite, petiolate, (ob)ovate to elliptic, to > 10 cm long, sparsely to densely covered with silvery scales. Flowers in ca. 3–10 cm long spikes, with minute yellowish(-green) petals and exserted filaments (ca. ½ cm long). Fruit straw-colored to brown, with 4 papery wings, ca. 1–2.5 cm long.

LL. Disturbed woodland; steep rocky slopes. Rare. Flowers in the dry season.

Note. This and the following species only occur in the lowest areas (2,000 m and below; Jinbar valley and tributaries).

Terminalia schimperiana Hochst.

Tree to ca. 5 m tall, with blackish-grey, fissured bark. Leaves spirally arranged, petiolate, dull green (olive green), elliptic to obovate, to > 20 cm long, acuminate to acute at tip, hairy when young. Flowers in tomentose spikes to > 10 cm long, heavily scented, with white or creamy-white hairy sepals (petals absent) and exserted filaments. Fruit yellowish to yellowish-brown, with 2 papery wings, ca. 5 cm long

LL. Steep rocky slopes. Locally common. Flowers in the dry season.

RHIZOPHORACEAE (76)

Trees or shrubs with opposite, simple leaves with or without interpetiolar stipules. Flowers bisexual, regular. Sepals united, 4–numerous; petals free, often clawed; stamens at least twice as many as petals. Ovary superior (in the Simen). Fruit a capsule (in the Simen; viviparous only in coastal mangroves).

Cassipourea malosana (Baker) Alston

Tree to c. 15 m long with grey, smooth bark. Leaves petiolate, elliptic to obovate, distinctly serrate at margins, to ca. 10 cm long. Flowers 1–5 per leaf axil, creamy-white, ca. 1.5 cm in diam., with laciniate petals and 15–20 stamens. Capsule ovoid, > 1 cm long, crowned by persistent style.

LL. Mossy forest along streams. Locally common. Flowers in the wet season.

CLUSIACEAE (GUTTIFERAE) (incl. Hypericaceae) (77)

Trees, shrubs or herbs. Leaves opposite or sometimes whorled or alternate, dotted with glands or resin canals, without stipules. Flowers mostly in terminal inflorescences, regular, yellow or white, 5-merous (in the Simen). Sepals free or partly united, often glandular; petals free, twisted in bud. Stamens numerous, often basally united into bundles. Ovary superior, 1–many-chambered. Fruit a capsule (in the Simen).

1 Carpet-forming perennial herb ..... *Hypericum scioanum*
Shrubs or trees 2

2 Leaves crowded (internodes very short); styles free at tip ..... *Hypericum revolutum*
Leaves spaced out (internodes relatively long); styles fused at tip 3

3 Petals falling at fruiting; leaves with lax reticulate venation ..... *Hypericum quartinianum*
Petals persistent on fruits; leaves with dense reticulate venation ..... *Hypericum roeperianum*

Fig. D14. – A-B, Combretum molle, *A, flowering inflorescences, B, fruits. – C-D,* Terminalia schimperiana, *C, habit, D, young inflorescences. – E,* Cassipourea malosana, *flowering branch.*

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Hypericum revolutum Vahl
Shrub or small tree to c. 4 m tall. Leaves narrowly elliptic to oblong or oblanceolate, to ca. 4 x 1 cm. Flower solitary, yellow, ca. 4–8 cm in diam. Capsule to ca. 1.5 cm long.
LL, **ESC**, **UL**. Scrubland; often with *Erica*. Common. Flowers in the dry and wet season.

Hypericum quartinianum A.Rich.
Shrub or sometimes small tree to c. 2 m tall. Leaves ovate-lanceolate to oblong-elliptic, to ca. 9 x 2.5 cm. Flowers several (ca. 3–9) together, yellow, ca. 4–7 cm in diam.; dry petals not persistent in fruit. Capsule as above.
LL. Forest edges; in gullies, along streams, in scrub. Common. Flowers in the dry and wet season.

Hypericum roeperianum W.G.Schimp. ex A.Rich.
Shrub or bushy small tree to ca. 3 m tall. Leaves lanceolate to elliptic, to 10 x 4 cm. Flowers ca. 1–3 together, yellow, ca. 3–5 cm in diam.; dry petals persistent in fruit. Capsule as above.
LL. Forest edges, bushland. Rare. Flowers in the wet season.

Hypericum scioanum Chiov.
Carpet-forming perennial with to c. 30 cm long stems, rooting at nodes. Leaves ovate to subcircular, to ca. 1 cm long. Flowers solitary, (pale) yellow, < 1 cm in diam. Capsule ca. 0.5 cm long.
LL, **UL**. Damp places in grassland. Common. Flowers in the wet season.

TILIACEAE (79)
Trees, shrubs or herbs (*Triumfetta* in the Simen), often with star-shaped, branched or simple hairs. Leaves stipulate, alternate (often in 2 ranks), simple, typically with palmate venation, usually asymmetrical. Flowers bisexual (in the Simen), regular, 4–5-merous. Sepals free or united at base; petals free, often with a glandular appendage at the base. Stamens numerous, free, often borne on a short column. Ovary superior. Fruit a drupe or capsule.

Grewia tembensis Fresen. var. **tembensis**
Shrub to ca. 2.5 m tall. Leaves ± elliptic, to ca. 8 x 4 cm. Inflorescence leaf-opposed, to 3-flowered. Flowers white, ca. 1.5 cm in diam. Fruit a 2–4 lobed drupe, ca. 1 cm in diam.
LL. Steep rocky slopes. Rare. Flowers in the dry season.
Note. Only occurs in the lowest areas (2,000 m and below; Jinbar valley and tributaries).

Sparmannia ricinocarpa (Eckl. & Zeyh.) Kuntze
Subshrub to shrub to c. 2 m tall, pubescent with long simple hairs. Leaves petiolate, broadly cordiform in outline, deeply 3–5-lobed, to > 10 cm long. Flowers several to many in terminal umbels, pale pink, whitish, purplish or lilac, ca. 2–2.5 cm in diam.; stamens > 50, with yellow filaments. Fruit an ellipsoid capsule to ca. 1.5 cm long, beset with bristles to 1 cm long.
LL. Forest edges; secondary forest and scrub; along streams. Common. Flowers in the wet season.

Triumfetta rhomboidea Jacq.
Perennial herb to 1 m tall, pubescent with long simple hairs. Leaves petiolate, ovate to broadly elliptic in outline deeply 3-lobed, to ca. 10 x 8 cm. Flowers in clusters on elongated, spike-like inflorescences, yellow, < 1 cm in diam., with ca. 15 stamens. Fruit a globose capsule < ½ cm in diam., with terminally hooked bristles.
LL. Edge of farmland scrub; usually in disturbed places. Common. Flowers in the wet season.

Fig. D15. – A-E, Hypericum *spp.; A-B*, H. revolutum; *C-D*, H. quartinianum; *E*, H. scioanum. – *F*, Grewia tembensis. – *G-H*, Sparmannia ricinocarpa, *pink- and white-flowered form.* – *I*, Triumfetta rhomboidea, *fruits with hooked bristles.*

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STERCULIACEAE (80)
Trees (in the Simen) with stellate indumentum and simple, alternate, stipulate leaves. Flowers in cymes or panicles, regular, bi- or unisexual, 5-merous. Sepals free; petals free, sometimes absent (*Sterculia*). Stamens 5 to many, filaments united into a basal tube or at apex of androphore. Ovary superior, sessile (*Dombeya*) or stipitate (*Sterculia*). Fruit a capsule (*Dombeya*) or made up of woody follicles (*Sterculia*).

Dombeya torrida (J.F.Gmel.) P.Bamps
Shrub or tree to c. 15 m tall. Leaves petiolate, broadly cordiform, blades to ca. 30 cm long. Flowers several to many in umbel-like inflorescences, white or slightly pinkish at base, bisexual. Fruit an ovoid to globose capsule to ca 1 cm long.
LL. Forest. Locally common (upper parts of Adarmaz forest). Flowers in the dry season.

Sterculia setigera Del.
Tree to c. 10 m tall with bark producing greyish to purplish papery flakes; leafless in the dry season. Leaves petiolate, broadly cordiform, deeply 5-lobed, to ca. 15 cm long. Flowers in panicles to ca. 10 cm long, reddish to brownish-green, to ca 2. cm in diam., unisexual; male flowers with androphore to 1 cm long, female flowers with gynophore. Follicles woody and thick-walled, densely hairy, ca. 7–9 cm long.
LL. Steep rocky places. Rare. Flowers at the beginning of the wet season.
Note. Only occurs in the lowest areas (2,000 m and below; Jinbar valley and tributaries).

MALVACEAE (82)
Herbs or shrubs with alternate, simple, often variously lobed, palmately veined, stipulate leaves. Flowers regular, bisexual, 5-merous; sepals sometimes subtended by an epicalyx; petals free. Stamens numerous, filaments united into a tube around the style, anthers free. Ovary superior, 2- to many-locular. Fruit a capsule or a schizocarp breaking into 1-seeded mericarps.

Hibiscus berberidifolius A.Rich.
Stiffly erect, many-stemmed shrub to c. 2 m tall. Leaves ovate or elliptic to orbicular, unlobed or rarely slightly 3-lobed, to ca. 6 cm long. Flowers in leaf-axils or racemes, with lanceolate epicalyx lobes, white to pale yellow or pale pink, with maroon centre, > 5 cm in diam. Fruit a densely hispid-strigose capsule, ca. 1–1.5 cm long.
LL. Along streams, secondary forest, scrub. Uncommon. Flowers in the wet season.

Pavonia urens Cav.
Shrubby herb to ca. 1.5 m tall, with simple, easily detachable irritating hairs and mostly also large stellate hairs. Leaves petiolate, cordi- or reniform, slightly 3–7-lobed, to ca. 20 cm long. Flowers solitary or in clusters, arranged in spike-like inflorescences, with small epicalyx lobes adpressed to calyx, pink to red or purple, usually with dark centre, < 5 cm in diam. Fruit a subglobose schizocarp; mericarps with 3 apical, retrorsely barbed awns.
LL. Disturbed sites (farmland scrub, clearings, etc.). Common. Flowers in the wet season.

Malva verticillata L.
Erect to decumbent, hairy annual or biennial herb to c. 2 m tall. Leaves petiolate, cordi- to reniform, shallowly 5-lobed, to ca. 20 cm long. Flowers in axillary clusters, often grouped into spike-like inflorescences, with small lanceolate epicalyx lobes, white to bluish white, ca. 2 cm in diam. Fruit a discoid schizocarp with ca. 10 wedge-shaped mericarps.
LL, **UL**. Mostly in disturbed sites (clearings, cultivated areas, near huts). Common. Flowers in the wet season.

EUPHORBIACEAE (85)
Monoecious or dioecious trees, shrubs or herbs, sometimes succulent, often with milky latex. Leaves mostly alternate, usually simple, entire or lobed, stipulate. Flowers unisexual,

Fig. D16. – A-B, Dombeya torrida, *A, crown (foreground), B, flowers. – C-D,* Sterculia setigera, *C, habit, D, new foliage and young fruit (not yet dehisced).*

small to minute, regular, either very reduced and borne in modified cup-like structures (flower-like cyathia) or in regular inflorescences. Petals often absent. Ovary superior, mostly 3-locular. Fruit usually a capsule-like schizocarp with 3 mericarps ('cocci'), each opening by means of 2 valves. Seeds often with a oil-rich appendage ('caruncle').

1 Plants succulent 2
Plants not succulent 3

2 Tree to > 20 m tall, with rounded, often open crown; stems broadly 3–4-winged; leaves 6–20 cm long, obovate, ± persistent; cyathia solitary; afromontane forest component ..... *Euphorbia ampliphylla*
Tree to ca. 5 m tall, with inverted conical crown; stems 4–8-ribbed; leaves scale-like, falling off soon; cyathia crowded; dry, rocky hillsides ..... *Euphorbia abyssinica*

3 Shrubs or trees 4
Herbs 7

4 Leaves palmately lobed ..... *Ricinus communis*
Leaves not lobed 5

5 Tree with stellate hairs ..... *Croton macrostachyus*
Shrubs without stellate hairs 6
6 Leaves to 20 cm long, old leaves turning bright orange or red ..... *Clutia abyssinica*
Leaves 2–4 cm long, simple, in one plane on short shoots, in an arrangement resembling a compound leaf ..... *Flueggea virosa*
7 Leaves palmately lobed ..... *Ricinus communis*
Leaves not lobed 8
8 Slender, prostrate ephemeral with leaves to ca. 1.5 cm long ..... *Euphorbia inaequilatera*
Habit not as above; leaves (considerably) larger 9
9 Erect, subshrubby herb to 2 m tall, with long-petiolate leaves; inflorescences catkin-like ..... *Acalypha psilostachya*
Smaller herbs with sessile leaves; inflorescences not catkin-like 10
10 Perennial herb with several ascending stems arising from a woody rootstock ..... *Euphorbia petitiana*
Annual herb, not branching from the base ..... *Euphorbia schimperiana*

Flueggea virosa (Willd.) Voigt. subsp. **virosa**
Dioecious shrub or small tree to ca. 3.5 m tall. Leaves petiolate, elliptic to obovate. Flowers axillary; petals absent; male in dense clusters, female 1–few together. Fruit ca. ½ cm in diam., white, fleshy, ± indehiscent.

LL. Edge of riverine forest or along small streams; steep, wet rocky slopes. Uncommon. Flowers in the wet season.

Clutia abyssinica Jaub. & Spach. var. **abyssinica**
Dioecious shrub to ca. 1.5 m tall. Leaves petiolate lanceolate, elliptic or ovate. Flowers in axillary clusters, greenish yellow to white, shortly pedicellate (pedicels of female flowers elongating in fruit to 2 cm). Spherical capsule ca. ½ cm in diam.

LL. Mostly in disturbed areas (farmland scrub, etc.). Common. Flowers in the dry season.

Ricinus communis L.
Monoecious shrub or tree-like herbs, sometimes > 2 m tall. Leaves with petioles to ca 0.3 m long and palmately lobed blades to 1 m across; blades with 2 glands at petiole insertion. Flowers in racemes to ca. 30 cm long, with clusters of male flowers below and female flowers above; petals absent; male flowers with very many creamy-white stamens; female flowers with red styles. Fruit 3-lobed, ca. 1.5 cm long, with soft spines.

LL. Along seasonally dry watercourses; in villages, around houses. Common. Flowers in the wet season.

Acalypha psilostachya Hochst. var. **psilostachya**
Monoecious herb or subshrub to ca. 2 m tall. Leaves with petioles to 10 cm long, blades ovate, ± as long as petiole, margins (crenate-)serrate. Flowers very small, in catkin-like axillary racemes, with male flowers and female flowers below (their bracts deeply digitately lobed). Fruits minute.

LL. Forest edges; along streams. Uncommon. Flowers in the wet season.

Croton macrostachyus Del.
Dioecious shrub or tree to ca. 15 m tall, with longitudinally fissured bark and an indumentum of stellate hairs. Leaves with petioles to 10 cm long, blades ovate, to 15 x 10 cm. Flowers in racemes to > 20 cm long, with creamy-white petals; male flowers in clusters, female flowers solitary on inflorescence axes. Capsule to ca. 1 cm long.

LL. Montane forest; often as solitary tree in secondary (farmland) scrub and disturbed areas. Common. Flowers in the wet season.

Fig. D17. – A, Flueggea virosa, *branch with male buds. – B,* Clutia abyssinica, *branches from male (left) and female (right) shrub. – C-D,* Ricinus communis, *C, fruits, D, inflorescence with male flowers below and female above. – E-F,* Acalypha psilostachya, *F, inflorescences. – G-H,* Croton macrostachyus, *G, part of female plant with fruits, H, crown of male plant with inflorescences.*

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Euphorbia ampliphylla Pax (syn. E. *obovalifolia* sensu auctt., non A.Rich.)
Succulent tree to > 20 m tall, with rounded, often open crown; stems broadly 3–4-winged. Leaves 6–20 x 2–7 cm, obovate, ± persistent on young shoots, with paired spines at leaf base. Flowers in solitary cymes. Capsule subglobose, ca. 1 cm in diam.

LL. Drier and wetter types of forest, in the former often with *Olea*; forest remnants. Common. Flowers in the wet season.

Euphorbia abyssinica Gmel.
Succulent tree to ca. 5 m tall, with broadly obconical crown; stem 4–8-ribbed, slightly but regularly constricted into segments. Leaves scale-like, falling off soon, paired spines at leaf base very small. Flowers in crowded cymes, bright yellow. Capsule as above, reddish.

LL. Dry rocky hillsides. Locally common/rare. Flowers in the beginning of the wet season.

Note. Only seen around Mesheha valley (and its tributaries).

Euphorbia petitiana A.Rich.
Glabrous, non-succulent perennial herb to ca. 30 cm tall with several ascending reddish stems arising from a woody rootstock. Leaves sessile, oblanceolate, ca. 2-3 x < 1 cm, often flushed deep or bright red when old. Flowers (cyathia) yellowish, in ill-defined pseudo-umbel. Capsule smooth, exserted, < ½ cm long.

LL, **UL**. Grass- and scrubland. Uncommon. Flowers in the wet season.

Euphorbia schimperiana Scheele
Non-succulent annual herb to ca. 50 cm tall, apparently never branching from base, smooth or upper parts sparsely hairy. Leaves sessile, (linear-)lanceolate, ca. 2.5–5 x 0.5–1 cm, often reddish when old. Flowers (cyathia) yellowish, in umbel-like inflorescences, rays subtended by opposite, amplexicaul bracts. Capsule as above.

LL, **UL**. Grassland, forest edges; often around fields and in fallow land. Common. Flowers in the wet season.

Euphorbia inaequilatera Sond. var. **inaequilatera**
Slender, non-succulent prostrate ephemeral herb. Leaves shortly petiolate, ovate, to ca. 1.5 cm long, with serrate margins. Flowers (cyathia) on lateral shoots, minute (ca. 1 mm). Capsules minute, < 2 mm long.

LL. Disturbed areas (overgrazed grassland, etc.). Rare. Flowers in the wet season.

PITTOSPORACEAE (86)
Evergreen trees with resin ducts in the bark and fruits. Leaves alternate, simple, entire, petiolate, without stipules. Flowers in terminal panicles (in the Simen), bisexual or functionally unisexual, regular, 5-merous; sepals and petals free; stamens 5. Ovary superior; style simple, with capitate stigma. Fruit a capsule opening by means of 2 valves (in the Simen). Seeds covered by viscid resin (in the Simen).

Pittosporum viridiflorum Sims
Shrub or tree to ca. 10 m tall, with dark grey, smooth, non-peeling bark. Leaves distinctly petiolate, spathulate, (ob)ovate or lanceolate, to > 10 cm long. Flowers pedicellate, in panicles to ca. 7 cm long, whitish, greenish or yellowish, > 1 cm in diam. Capsule to ca. 1 cm long, 4–8-seeded, with thin, spreading to reflexed valves.

LL. Wet forest, riverine forest, evergreen bushland. Common. Flowers in the dry season.

Pittosporum abyssinicum Del.
Similar to and difficult to distinguish from the above. Leaves subsessile. Capsules with thick, leathery to woody valves which are held erect or slightly spreading (not reflexed).

LL. Evergreen forest and bushland. Rare. Flowers in dry season.

Fig. D18. – A-D, Euphorbia *spp.*; *A*, E. ampliphylla; *B-C*, E. abyssinica, *C, fruiting; D*, E. inaequilatera, *habit. – E-F*, Pittosporum viridiflorum, *E, flowers, F, dehisced fruits showing resin-covered seeds.*

A
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D
E
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CRASSULACEAE (88)

Herbs or shrublets, often succulent. Leaves alternate, opposite or whorled, simple, without stipules. Inflorescences terminal or axillary, mostly cymose, many- to few-flowered. Flowers regular, 3–12 merous. Sepals and sepals free or joined. Stamens as many as or twice as many as the petals, free. Carpels as many as petals, free or shortly joined at base. Fruit a whorls of follicles.

1 Flowers 8–12-merous 2
Flowers (3-)4–6-merous 3

2 Erect, sprawling or hanging subshrubs with alternate leaves in large rosettes at the tips of the stems; flowers bright yellow ..... *Aeonium leucoblepharium*
Habit not as above; leaves in whorls of 3; flowers white ..... *Hypagophytum abyssinicum*

3 Leaves peltate, subcircular; flowers in terminal racemes ..... *Umbilicus botryoides*
Leaves and flower arrangement not as above 4

4 Leaves in basal rosette, plant with red stolons; flowers 6-merous ..... *Rosularia semiensis*
Not as above; flowers (3-)4- or 5-merous 5

5 Leaf margin irregularly dentate to crenate ..... 6 (*Kalanchoe*)
Leaf margin entire 7

6 Perennial with succulent decumbent stems to 3 cm in diam.; corolla tube ca. 1.5–2 cm long, flowers pale pink to white ..... *Kalanchoe petitiana*

Erect, slender annual or short-lived perennial with thin, not markedly succulent stems; corolla tube < 1.5 cm long, flowers yellow, orange or red ..... *Kalanchoe densiflora* var. *subpilosa*

7 Erect herbs to 30 cm or more tall, with fleshy rootstocks; flowers many in conspicuous terminal cymes 8
Small herbs without fleshy rootstocks; inflorescences less conspicuous, fewer-flowered 9

8 Plants very sparsely hairy ..... *Crassula vaginata*
Plants densely hairy ..... *Crassula alba*

9 Epiphytic subshrub with leaves in whorls of 3 ..... *Sedum epidendron*
Plants not epiphytic; leaves opposite 10

10 Annual of aquatic or at least very wet habitats, with ± linear leaves; flowers 4-merous ..... *Crassula granvikii*
Habitat not as above, if growing in ± wet areas, leaves broader; flowers predominantly 5-merous ... 11

11 Creeping perennial herb rooting at nodes; leaves ovate, ca. ½ – 1 cm wide ..... *Crassula alsinoides*
Small erect herbs not rooting at nodes; leaves linear to obovate, not more than ca. 3 mm wide 12

12 Leaves linear, to ca. 1 cm long; flowers minute, in condensed axillary cymes ..... *Crassula schimperi*
Leaves obovate, to ca. ½ cm long; flowers in numerous leafy cymes, small but showy ..... *Sedum crassularia*

Crassula alsinoides (Hook.f.) Engl.

Creeping herb, rooting at lower nodes. Leaves ovate, shortly petiolate, ca. ½–1 cm long. Flowers (pale) pink to whitish, 5(–6)-merous, usually solitary in leaf axils, ca. 1 cm in diam.

UL. Moist to wet areas along streams. Locally common. Flowers in the wet season.

Note. New record for the Simen.

Crassula granvikii Mildbr.

Mat-forming aquatic herb. Leaves linear to oblong, sessile, to ca. 1.5 cm long. Flowers white to pink or purplish, 4-merous, axillary, minute (< ½ cm in diam).

UL. Rock pools; wet depressions, in standing water. Locally common. Flowers in the wet season.

Crassula schimperi Fisch. & Mey. subsp. **schimperi**

Herb with erect to ascending stems beset with often closely spaced linear leaves to ca. 1 cm long. Flowers in condensed, axillary clusters, (4–)5-merous, dull white to pinkish, minute.

Fig. D19. – A-G, Crassula *spp.; A,* C. alsonoides*; B-D,* C. granvikii*, B, rock pools filled with* C. g. *(green), C, detail, D, flowers; E,* C. schimperi*; F-G,* C. vaginata*, G, detail of inflorescence.*

LL, **UL**. Rocky outcrops, in cracks of rocks (UL); in dry forest, sometimes epiphytic (LL). Locally common. Flowers in the wet season.

Crassula vaginata Eckl. & Zeyh.
Herb with swollen or fleshy rootstock, to ca. 30 cm tall when flowering, ± glabrous. Leaves decussate, ovate to lanceolate, the lower ones to ca. 10 cm long, with a distinct basal sheath to ca. 1–1.5 cm long. Flowers in a ± hemispherical terminal panicle, 5-merous, white, < 1 cm in diam.

UL. Rocky grassland. Uncommon. Flowers in the wet season.

Crassula alba Forssk.
Similar to the above but usually densely hairy. Leaves smaller and narrower and basal sheaths shorter. Flowers white or pink to red.

UL. In rock outcrops in grassland. Uncommon. Flowers in the wet season.

Hypagophytum abyssinicum (A.Rich.) Berger
Herb with succulent leaves in whorls of 3. Flowers in terminal cymes, white (sometimes faintly pink tinged), 10–12-merous, ca. 1–1.5 cm in diam.
LL, **ESC**, (UL). Wet shady rock faces. Uncommon. Flowers in the wet season.
Note. Endemic to Northern Ethiopia (and Eritrea).

Sedum crassularia Raym.-Hamet
Tiny annual to ca. 5 cm tall with closely spaced opposite, sessile obovate leaves to ca. ½ cm long. Flowers in numerous few-flowered cymes, pink to whitish, (3-)4–5-merous, ca. ½ cm in diam.
UL. Moss and lichen covered rocks in the highest areas. Rare. Flowers in the wet season.
Note. Outside Ethiopia only known from the high mountains of Kenya.

Sedum epidendron A.Rich.
Epiphytic pendent herb to ca.10–15 cm tall. Leaves in whorls of 3, narrowly oblong-elliptic, to ca. 3 cm long. Flowers in flat-topped cymes, bright yellow, 5-merous, ca. 1.5 cm in diam.
LL. On tree trunks or branches (mostly on *Juniperus*). Flowers in the wet season.
Note. Endemic to Ethiopia.

Rosularia semiensis (A.Rich.) Ohba
Herb with basal leaf rosettes producing conspicuous red-coloured stolons. Leaves sessile, obovate to spathulate, the largest to ca. 2 cm long. Flowers in few- to several-flowered inflorescences raised to ca. 5 cm above the rosettes, whitish-pink, mostly 6-merous, ca. 1.5 cm in diam.; corolla lobes ascending, joined below.
ESC, **UL**. Shady rock faces, in cracks of rocks. Common. Flowers in the wet season.
Note. Endemic to the Simen.

Aeonium leucoblepharum A.Rich.
Erect, sprawling or hanging subshrubs with alternate obovate to spathulate leaves in large rosettes at the tips of the stems. Flowers in large, hemispherical to conical many-flowered inflorescences, bright yellow, 8–10-merous, to ca. 2 cm in diam.
ESC, **UL**. Exposed, sunny rock faces, in cliffs. Common. Flowers in the dry season.

Umbilicus botryoides A.Rich.
Herb with tuberous rootstock. Basal leaves peltate, alternate, blades subcircular, to ca. 5 cm in diam. Flowers in erect racemes to ca. 10–15 cm long, greenish-white (sometimes flushed purple), 5-merous; corolla urceolate, to ca. 1 cm long, ± persistent and reddish in fruit.
UL. Shelter of rocks, both in half and full shade. Uncommon. Flowers in the wet season.

Kalanchoe petitiana A.Rich. var. **petitiana**
Perennial with succulent decumbent stems to 3 cm in diam. and to ca. ¾ m tall. Leaves opposite, broadly elliptic to ovate, to ca. 12 x 7 cm. Flowers in terminal several-flowered inflorescences, white to pale pink; corolla tubes to ca. 1.5–2 cm long.
LL. Rocky outcrops in grassland; overgrazed areas. Common. Flowers in the dry season.
Note. Endemic to Ethiopia.

Kalanchoe densiflora Rolfe var. **subpilosa** Cufod.
Erect herb to ca. ½ m tall with opposite, oblong to suborbicular leaves to ca. 15 cm long. Flowers in terminal many-flowered panicles, yellow, orange or red; tubes to ca. 1 cm long.
LL. Sheltered places among trees. Uncommon. Flowers in the wet season.
Note. Endemic to Ethiopia.

Fig. D20. – A-B, Hypagophytum abyssinicum, *A, habit, B, detail of flowers. – C,* Sedum crassularia. *– D-F,* Rosularia semiensis, *D, stolons with leaf rosettes, E, flowering, F, detail of flowers. – G,* Aeonium leucoblepharum, *habit. – H,* Umbilicus botryoides, *habit. – I-K,* Kalanchoe *spp.; I-J,* K. petitiana, *I, leafless in the dry season, J, flowers; K,* K. densiflora, *inflorescence.*

A
B
C
D
E
F
G
H
I
J
K

SAXIFRAGACEAE (89)

Perennial herbs. Leaves alternate, simple, mostly without stipules. Flowers mostly regular, 5-merous. Sepals and petals free, stamens usually twice as many as sepals. Ovary superior to partly inferior. Fruit a capsule.

Saxifraga hederifolia A.Rich.

Herb with trailing stems, several cm long. Leaves petiolate, reniform-orbiculate, ca. 5–7-lobed, blade to ca. 1 cm in diam. Flowers solitary on long pedicels, yellow, ca. 1 cm in diam.

UL. Base of rocks, ± shady and damp places; along streams. Uncommon. Flowers in the wet and dry season.

Note. Endemic to Ethiopia.

ROSACEAE (91)

Trees, shrubs or herbs. Leaves stipulate, alternate, simple or compound. Flowers regular, very variable. Receptacle very well developed, flat, convex or concave, cup-shaped. Sepals 5 or 4, sometimes with an epicalyx below. Petals 5 or absent, free. Stamens usually many, sometimes reduced to few or even 1. Ovary superior, half-inferior or inferior, carpels free or variously united, each with 1–2 ovules. Fruit fleshy (drupes or several drupelets) or dry (nuts or several nutlets).

1 Trees 2
Shrubs or herbs 4

2 Leaves pinnately compound; flowers unisexual, plant dioecious; male inflorescences mostly whitish, female inflorescences red, both drooping ..... *Hagenia abyssinica*
Leaves simple; flowers bisexual; inflorescences not as above ..... 3 (*Prunus*)

3 Evergreen tree, up to 20 m high; leaves leathery; flowers creamy white ..... *Prunus africana*
Fruit tree, up to 6 m high; leaves not leathery; flowers deep pink ..... *Prunus persica*

4 Shrubs, usually scandent or scrambling 5
Herbs 7

5 Fruit made up of many drupelets, each with a single seed; flowers to ca. 2 cm in diam. ..... 6 (*Rubus*)
Fruiting receptacle globose, enclosing many hairy nutlets; flowers much bigger ..... *Rosa abyssinica*

6 Flowers with pink petals longer than sepals, sepals reflexed at anthesis ..... *Rubus steudneri*
Flowers with white petals much shorter than sepals or absent; sepals not reflexed at anthesis ..... *Rubus apetalus*

7 Minute annual herb, only to 3 cm tall; flowers with 1 stamen; epicalyx absent ..... *Aphanes bachitii*
Perennial herbs, much taller; flowers with 4 stamens; epicalyx present ..... 8 (*Alchemilla*)

8 Stem and leaves (below) with densely adpressed silvery-silky hairs; leaves 9-lobed; inflorescences much exceeding the subtending leaves ..... *Alchemilla pedata*
Stem and leaf pubescence not as above; leaves 5-lobed; inflorescences hidden between or barely protruding from the stipules 9

9 Leaves to 5 cm wide; stipules green and leaf-like;..... *Alchemilla cryptantha*
Leaves to 1.5 cm wide; stipules membranous ..... *Alchemilla microbetula*

Rubus steudneri Schweinf.

Prickly scandent shrub with stems to several m long. Leaves simple, 3- or 5-foliate, leaflets obovate-elliptic, margins serrate-biserrate, usually white tomentose below. Flowers in a large, ± pyramidal panicle, pink, ca. 2 cm in diam.; sepals reflexed at anthesis. Fruit orange to dark red, with up to ca. 25 drupelets.

LL. Forest edges; secondary scrub. Common. Flowers in the wet season.

Rubus apetalus Poir.

Similar to the above, but leaves imparipinnate or trifoliate, pale and ± densely pubescent below. Flowers small, petals absent or occasionally to ca. ½ cm long and white or pink;

Fig. D21. – A, Saxifraga hederifolia. *– B-C,* Rubus steudneri, *B, scrambling over tree, C, inflorescence. – D-E,* Rosa abyssinica, *D, habit, with* Hypericum revolutum, *E, flowers.*

sepals clasping, not reflexed. Fruit black when fully mature, often with more drupelets than in the previous species.

LL. Edge of forest or scrub; along streams. Uncommon. Flowers in the wet season.

Rosa abyssinica Lindley

Shrub, often ± scandent, with prickly stems to several m long. Leaves evergreen, ± leathery, usually with 7 ovate to ± lanceolate leaflets to ca. 5 cm long. Flowers several to many in dense corymbs, white to pale whitish-yellow, ca. 5 cm in diam., fragrant. Stamens many, yellowish-orange. Receptacle (orange-)red and fleshy in fruit, to ca. 2 cm in diam.

LL, **ESC**, **UL**. In bushland or scrub, often forming thickets; forest edges; disturbed places. Common. Flowers in the dry season.

Alchemilla cryptantha Steud. ex A.Rich.
Weak, loosely pubescent herb with prostrate stems rooting at nodes. Leaves circular-reniform, 5-lobed, margins toothed, to ca. 5 cm wide; stipules foliaceous. Flowers very small, greenish-yellow, in axillary, few- to several-flowered inflorescences, barely protruding from the stipules.

LL. Moist, shady places in forest; along streams. Rare. Flowers in the wet season.

Alchemilla microbetula T.C.E.Fr.
Small prostrate herb with basal rosettes, producing stolons rooting at nodes. Leaves petiolate to ± sessile, blades broadly ovate, deeply 5-lobed, to ca. 1.5 cm wide; stipules membranous. Flowers very small, 1–3 together, usually hidden between stipules.

UL. Moist places, occasionally in shallow soil over rocks. Rare. Flowers in the wet season.

Alchemilla pedata A.Rich.
Stoloniferous herb with leaf rosettes. Stems and leaves with silvery-silky hairs. Rosette leaves usually deeply 9-lobed, to ca. 5 cm wide; stipules membranous. Flowers small, in inflorescences much exceeding the leaves.

(LL, ESC), **UL**. Moist places in grazed grassland. Uncommon. Flowers in the wet season.

Aphanes bachiti (Hauman & Balle) Rothm.
Minute annual herb, only to 3 cm tall. Leaves irregularly 4–7-lobed, < 1 cm long, stipules adnate to petiole and connate, covering at least the base of the inflorescence. Flowers minute, lacking an epicalyx, with only 1 stamen.

UL. Bare patches in grassland. Rare. Flowers in the wet season.

Note. Endemic to Ethiopia.

Prunus africana (Hook.f.) Kalkm.
Evergreen tree to 20 m tall, with longitudinally fissured or scaly dark brown bark; entirely smooth except for the flowers. Leaves petiolate, elliptic-oblong, leathery, simple, margin crenate-serrate, to 15 x 5 cm. Flowers ca. 10–30 in axillary racemes to ca. 7 cm long, creamy white, hairy, ca. ½ cm in diam. Stamens 25–35. Drupe red to purplish-brown, transversely ellipsoid, usually < 1 cm wide.

LL. Wet forest and forest remnants. Common. Flowers in the wet season.

Prunus persica (L.) Batsch
Fruit tree to ca. 5 m tall, with grey-brown splitting bark; young branches reddish, smooth. Leaves oblong-lanceolate, serrulate, to ca. 12 x 2.5 cm. Flowers subsessile, mostly solitary, deep pink, ca. 2–3 cm in diam. Fruit subglobose, 4–8 cm in diam., velvety.

LL. Cultivated in and around villages; occasionally escaped.

Note. This is the peach tree, a native of SW Arabia. The variety grown in the Simen (and elsewhere in Ethiopia) produces large quantities of small and hard but tasty fruits.

Hagenia abyssinica (Bruce) J.F.Gmel.
Dioecious tree to 15 m tall, with brownish bark peeling in strips. Leaves imparipinnate, with 5–8 narrowly oblong leaflets on each side, to 40 cm long; petioles winged (i.e. with adnate stipules), to > 10 cm long. Flowers unisexual, in conspicuous pendulous panicles to > ½ m long and 30 cm wide (male inflorescences usually less extensive than females); male flowers mostly whitish; female flowers red (especially conspicuous in fruit). Nutlets enclosed in receptacle bearing persistent calyx lobes (serving as wings).

LL. Wet forest; in gullies. Locally common. Flowers in the wet season.

Note. The dried female inflorescences of the 'kosso' tree provide a strong anthelmintic; it is widely used in the traditional medicine to treat tapeworm (acquired by eating raw beef).

Fig. D22. – A, Alchemilla *cf.* pedata. *– B-C,* Prunus *spp.; B, stand of* P. africana*; C, fruits of* P. persica *(Debark market). – D-F,* Hagenia abyssinica*, D-E, female tree and inflorescences, F, leaves and stipules.*

A
C
E
F
D

FABACEAE (LEGUMINOSAE) **(95)**
Trees, shrubs, lianas or herbs. Leaves stipulate, alternate, variously compound, occasionally 1-foliate. Flowers mostly in spikes, racemes or head-like inflorescences, mostly bisexual, regular or zygomorphic. Sepals usually united. Petals 5, sometimes fewer or absent, mostly free. Stamens 10 or sometimes more or fewer. Ovary almost always a solitary superior carpel. Fruit a pod, typically dehiscing into 2 valves but sometimes indehiscent or breaking into 1-seeded segments.

Following FEE, the family is divided into 3 subfamilies, the Caesalpinioideae, Mimosoideae, and Papilionoideae (in other floras the legumes are treated as 3 separate families, the Caesalpiniaceae, Mimosaceae and Fabaceae (or Papilionaceae).

Subfam. CAESALPINIOIDEAE
Distinguished by usually ± regular flowers with 10 (or fewer) free stamens.

Pterolobium stellatum (Forssk.) Brenan
Climbing or straggling shrub. Stems to > 10 m long, with recurved prickled paired at nodes and often also scattered on internodes. Leaves bipinnate, with > 10 pairs of pinnae and > 10 leaftlet pairs on pinnae, with prickles as the point of insertion of the pinnae. Flowers in many-flowered dense terminal racemes, pale creamy yellow, sweetly scented, small (< 1 cm in diam.). Pod red to scarlet, indehiscent, 1-seeded, with a broad distal wing, to > 5 cm long.

LL. Forming thickets at forest margins; in bushland and scrub. Common. Flowers in the wet season.

Subfam. MIMOSOIDEAE
Distinguished by small regular flowers with numerous, long-exserted, showy stamens and relatively small petals (in the Simen).

1 Plants with armed with thorns, spines or prickles 2
Plants unarmed; big tree with flat-topped canopy and smooth, grey bark ..... *Albizia schimperiana*

2 Some short lateral branchlets developed as thorns ..... *Dichrostachys cinerea*
Spines or prickles replacing stipules and paired at nodes ..... 3 (*Acacia*)

3 Tree with flat-topped crown ..... *Acacia abyssinica*
Crown not flat-topped 4

4 Prickles recurved; flowers in red to purple colored spikes ..... *Acacia venosa*
Spines straight; flowers in creamy colored heads ..... *Acacia pilispina*

Dichrostachys cinerea (L.) Wight & Arn.
Shrub to ca. 2.5 m tall with some thorns (modified branchlets). Leaves bipinnate, with > 10 pairs of pinnae and numerous paired, ± linear leaflets on pinnae. Flowers in pendulous spikes, mauve-pink (later whitish) sterile flowers above, yellow fertile flowers below. Pods indehiscent, contorted.

LL. Woodland. Uncommon. Flowers in the wet season.

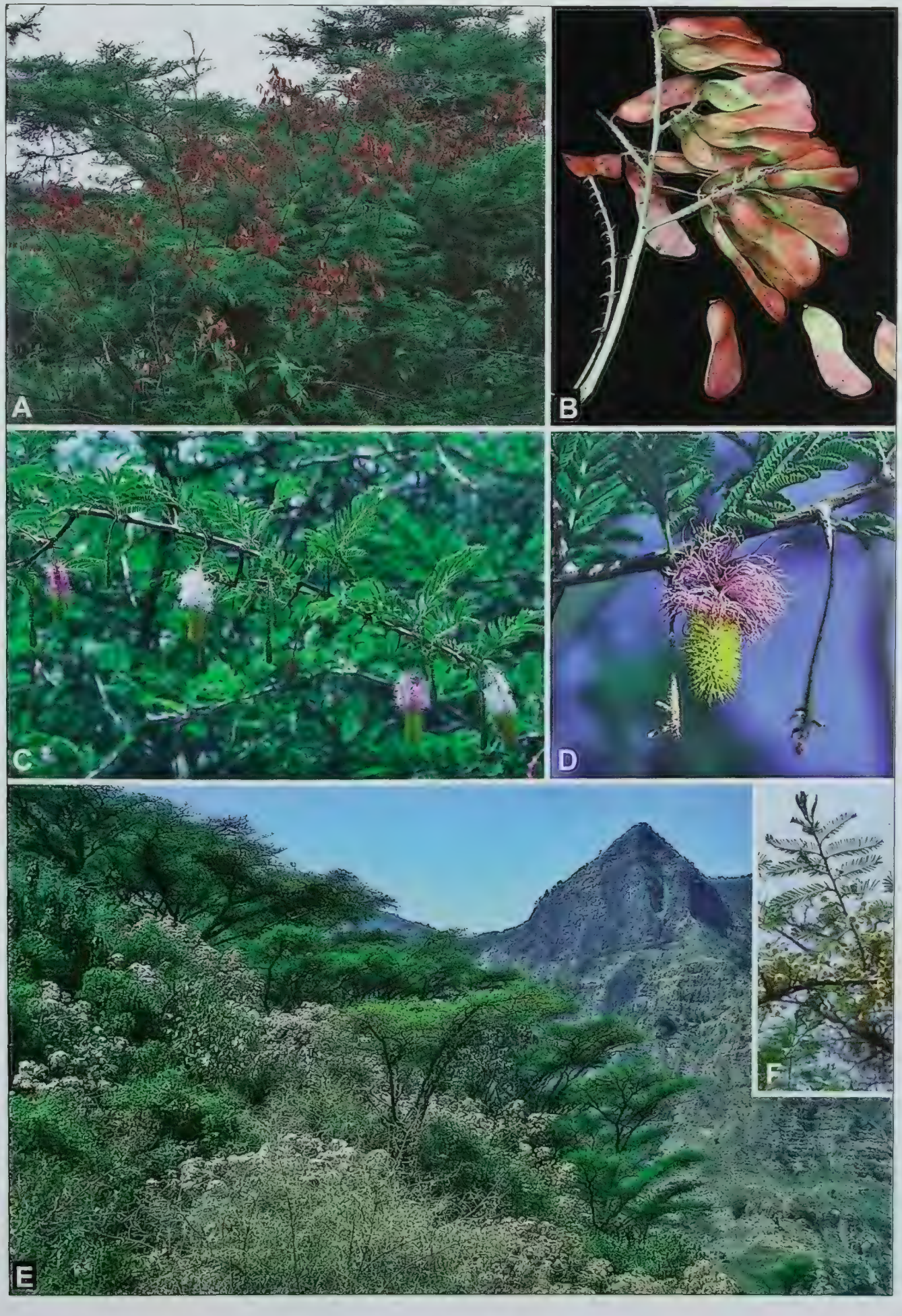
Note. New record for the Simen; only known from the lowest areas (2,000 m and below; Jinbar valley and tributaries).

Acacia abyssinica Hochst. ex Benth. subsp. **abyssinica**
Tree, to ca. 10 m tall, with flat-topped crown to > 10 m in diam. and dark, fissured bark. Stipular spines straight, to 4 cm long. Leaves bipinnate, with very numerous pinnae and leaflets. Flowers in white, pedunculate globose heads. Pods straight or slightly curved, dehiscent, to ca. 10 cm long.

LL. Wooded grassland, woodland, forest margins. Common. Flowers in the wet season.

Note. The subspecies is endemic to Ethiopia.

Fig. D23. – A-B, Pterolobium stellatum, *A, habit, B, winged pods. – C-D,* Dichrostachys cinerea, *note thorns in C. – E-F,* Acacia abyssinica, *E, habit, F, flowering heads.*


A
B
C
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E
F

Acacia venosa Hochst. ex Benth.
Small tree to ca. 5 m tall, with rounded crown. Prickles paired, recurved, to ½ cm long, sometimes absent. Leaves bipinnate, with 3–6 pairs of pinnae and ca. 6–12 pairs of leaflets on pinnae. Spikes to ca. 5 cm long, produced before or with the new leaves, appearing reddish-purplish in bud. Pods straight, dehiscent, ca. 10 cm long.
LL. Woodland remnants; solitary tree in farmland. Rare. Flowers in the dry season.
Note. Endemic to Ethiopia.

Acacia pilispina Pic.-Serm.
Shrub or small tree to ca. 7 m tall, with ± irregular crown and yellowish-brown bark coming off in thin flakes. Stipular spines straight, to 5 cm long. Leaves bipinnate, with > 10 pairs of pinnae and ca. 10–20 pairs of leaflets on pinnae. Flowers in creamy white pedunculate heads. Pods straight or slightly curved, dehiscent, to ca. 10 cm long.
LL. Woodland remnants, bush- and scrubland. Uncommon. Flowers in dry season.

Albizia schimperiana Oliv.
Tree, to ca. 15 m tall, with flat-topped crown and smooth grey bark. Leaves bipinnate, with ca. 3–7 pairs of pinnae and ca. 10–20 pairs of leaflets on pinnae; leaflets obliquely oblong. Flowers in white to pale yellow axillary pedunculate heads. Pods oblong, to > 30 cm long.
LL. Wet forest; along streams or in river valleys. Common. Flowers in the wet season.

Subfam. PAPILIONOIDEAE
Plants herbaceous or woody. Leaves alternate, usually variously compound, occasionally simple (1-foliate), with stipules. Flowers irregular. Corolla of 5 unequal petals, the upper one large and conspicuous (standard), the 2 side ones small and stalked (wings), the 2 basal ones united into a boat-shaped structure (keel). Stamens 10; filaments variously united, rarely free, usually 9 fused and 1 free. Ovary superior. Fruit a pod.

Leaves trifoliate ..... **Key a**
Leaves pinnately compound ..... **Key b**

Key a
1 Trees, shrubs or woody climbers 2
Herbs 5
2 Trees with prickly branchlets; corolla scarlet to pale pink ..... *Erythrina* abyssinica
Shrubs or woody climbers different in all characters 3
3 Plant covered with rusty-red or silvery hairs ..... *Argyrolobium schimperianum*
Plant not as above 4
4 Corolla blackish-purple (greenish-white in bud); pods ± S-shaped, covered with dense orange irritant bristly hairs ..... *Mucuna melanocarpa*
Corolla yellow with purple veins; pods narrowly oblong, covered with white hairs but not as above ..... *Rhynchosia resinosa*
5 Pods spirally coiled 6
Pods not spirally coiled 7
6 Pods flattened or shortly cylindrical ..... *Medicago polymorpha*
Pods subglobose, not flattened and cylindrical ..... *Medicago minima*
7 Anthers long and short alternating; keel beaked 8
Anthers uniform; keel not as above 9
8 Corolla yellow with dark marks at base; pods glabrous ..... *Crotolaria quartiniana*
Corolla yellow with purple veins; pods with spreading hairs ..... *Crotolaria incana* subsp. *purpurascens*
9 Corolla bright yellow ..... *Argyrolobium rupestre* subsp. *remotum*
Corolla not yellow 10
10 Flowers in lax, terminal or axillary inflorescences; pods flattened, with up to 5 narrowly oblong segments ..... *Desmodium repandum*
Flowers in heads; pods not as above, surrounded by persistent calyx and corolla ..... 11 (*Trifolium*)
11 Plant mat-forming 12
Plant not mat-forming 13

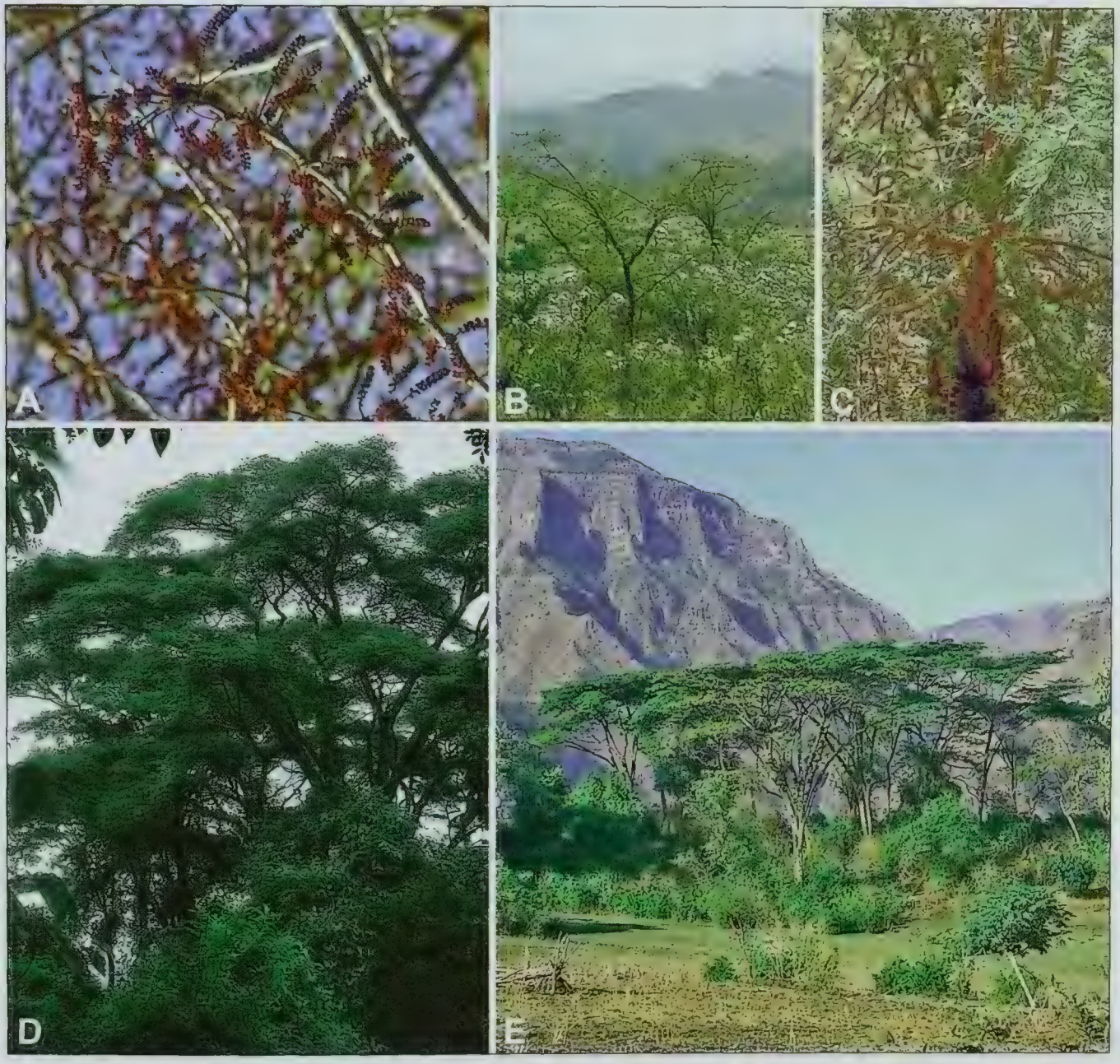


Fig. D24. – A-C, Acacia *spp.; A,* A. venosa, *inflorescences in bud; B-C,* A. pilispina, *C, detail showing bark. – D-E,* Albizia schimperiana, *D, natural forest, E, graveyard forest (Nariya village).*

12 Heads many-flowered; pods 1-seeded ..... *Trifolium cryptopodium*
Heads 1-5-flowered; pods 2-4-seeded ..... *Trifolium acaule*
13 Corolla red or red-violet 14
Corolla purple, white-pink or white 15
14 Inflorescences many-flowered; pods 1-2-seeded ..... *Trifolium simense*
Inflorescences 1-5-flowered; pod 8-15-seeded ..... *Trifolium schimperi*
15 Corolla white or white-pink 16
Corolla purple (if rarely white then seeds 2-3-seeded: *Trifolium rueppellianum, Trifolium baccariana*) 17
16 Leaflets linear-oblong; pods 1-2-seeded ..... *Trifolium arvense*
Leaflets orbicular, obovate or oblong-elliptic; pods 2-6-seeded ..... *Trifolium semipilosum*
17 Inflorescences ± oblong, often more than twice as long as broad; growing in swampy grassland ..... *Trifolium polystachyum*
Inflorescences not elongated as above; usually not in swampy grassland 18
18 Pods 2–4 seeded 19
Pods 5–10-seeded 21

19 Leaflets to ca. 40 mm long; inflorescence bracts distinct, forming an involucre ..... *Trifolium steudneri*
Leaflets not longer than 25 mm; inflorescence bracts minute 20
20 Corolla 5–8 mm long ..... *Trifolium rueppellianum*
Corolla shorter, 3–4 mm long ..... *Trifolium baccarinii*
21 Calyx with 11 veins; petiole ca. 8.5 cm long ..... *Trifolium calocephalum*
Calyx many-veined (ca. 20-30); petiole not longer than 6 cm 22
22 Inflorescences subsessile, 1-2-flowered ..... *Trifolium elgonse*
Inflorescences ± pedunculate, to 6(-8)-flowered ..... *Trifolium multinerve*

Key b

1 Large tree to 20 m high; leaflets up to 27 ..... *Millettia ferruginea*
Shrubs or small trees to c. 6 m high at the most, leaflets fewer, or herbs 2
2 Woody plants 3
Herbs 6
3 Pods inflated; corolla dark reddish-brown ..... *Colutea abyssinica*
Pods not inflated; corolla variously colored, but not as above 3
4 Yellow flowers in pendulous racemes ..... *Calpurnia aurea*
Flowers not yellow 5
5 Pods breaking transversely into 1-seeded, indehiscent segments ..... *Ormocarpum pubescens*
Pods opening along sutures ..... *Indigofera arrecta*
6 Pods curved almost into a circle, indehiscent ..... *Vermifrux abyssinica*
Pods not as above, dehiscent 7
7 Plant covered with appressed or spreading hairs; corolla white with pink marks ..... *Lotus discolor*
Plant smooth; corolla yellow, less commonly pinkish ..... *Astragalus atropilosus*

Calpurnia aurea (Ait.) Benth.
Shrub or tree to 6 m tall, young branches and inflorescences covered with dense hairs. Leaves imparipinnate; leaflets ovate, oblong to obovate. Flowers in 8-30-flowered pendent racemes. Corolla yellow. Pod straw-coloured or brownish with broad wing along the upper edge, 4-8 seeded.
LL. Montane forest margin. Common. Flowers in the wet season.

Millettia ferruginea (Hochst.) Baker subsp. **ferruginea**
Tree to c. 20 m tall. Leaves imparipinnate; leaflets oblong, copious hairs on the lower side, up to 27. Calyx with golden brown hairs. Corolla violet, standard silky outside. Pod flat, woody, 5-10-seeded.
LL. Riverine forest. Common. Flowers in the wet season.

Indigofera arrecta Hochst. ex A.Rich.
Shrub or woody herb to 2(-3) m tall. Leaves imparipinnate; leaflets elliptic-oblong, 7-17. Racemes many-flowered. Corolla reddish, but standard brown strigulose outside. Pod straight and deflexed, 4-6-seeded.
LL. Montane forest edges, scrub. Common. Flowers in the wet season.

Ormocarpum pubescens (Hochst.) Cufod. ex Gillett
Shrub or small tree to 3 m tall. Leaves imparipinnate; leaflets elliptic-oblong, slightly white haired beneath. Inflorescences 1-2-flowered. Corolla purplish, persistent. Pods hairy, breaking transversely into several 1-seeded indehiscent elliptic segments.
LL. Woodland, bushland. Rare. Flowers in the wet season.

Desmodium repandum (Vahl) DC.
Perennial herb or slender shrub to 1 m tall, hairy. Leaves trifoliate; leaflets ± rhombic, appressed pilose on both sides. Inflorescences lax, racemose or paniculate. Corolla pink to brick red. Pods with 5 narrowly oblong moon-shaped indehiscent segments, the upper suture straight and the lower slightly indented.
LL. Montane forest edges, clearings, stream banks. Common. Flowers in the wet season.

Fig. D25. – A-B, Calpurnia aurea, *A, habit, B, inflorescence and fruits. – C,* Millettia ferruginea, *fruiting tree. – D-E,* Desmodium repandum, *D, flowering and fruiting inflorescences, E, flowers.*

Erythrina abyssinica Lam. ex DC.
Tree or shrub to 10 m tall with prickly branchlets. Leaves pinnately trifoliate; leaflets broadly ovate or rhomboid. Petals scarlet to pale pink. Pods woody, strongly constricted between seeds; seed red-black.
LL. Wooded grassland, woodland. Common. Flowers leafless in the dry season.

Mucuna melanocarpa Hochst. ex A.Rich.
Woody climber to c. 10 m long covered with hairs. Leaves pinnately trifoliate; leaflets broadly ovate or rhomboid with appressed silvery hairs beneath. Inflorescences pendulous, many-flowered. Corolla blackish-purple (greenish-white in bud). Pods ± S-shaped, longitudinally ribbed, covered with dense orange irritant bristly hairs.
LL. Woodland, forest edges. Rare. Flowers in the wet season.
Note. New record for the Simen; endemic to Ethiopia.

Rhynchosia resinosa (Hochst. ex A.Rich.) Baker
Sticky woody scrambling shrub covered with dense short glandular hairs. Leaves trifoliate; leaflets triangular or rhomboid, distinctly pale beneath. Corolla yellow with purplish veins. Pods with pale brown reticulation and covered with whitish hairs.
LL. Thickets, woodland, waste ground. Common. Flowers in the wet season.

Crotolaria quartiniana A.Rich.
Erect or straggling annual herb to c. 1 m tall. Leaves trifoliate; leaflets narrowly elliptic to ovate, sparsely pilose on both sides. Corolla yellow, standard with dark marks at base. Pods smooth, narrowed into a short stipe.
LL. Montane forest edges. Common. Flowers in the wet season.

Crotolaria incana L. subsp. **purpurascens** (Lam.) Milne-Redh.
Herb to c. 1 m tall covered with usually long yellow-brown spreading hairs. Leaves trifoliate; leaflets obovate to suborbicular, upper side smooth and lower slightly hairy. Corolla yellow, standard with purplish veins. Pods many-seeded, covered with spreading hairs, sessile.
LL. Stream banks, disturbed areas, woodland. Common. Flowers in the wet season.

Argyrolobium rupestre (E.Mey.) Walp. subsp. **remotum** (Hochst. ex A.Rich.) Polhill
Prostrate, straggling or slightly erect herb covered with hairs. Leaves digitately trifoliate; leaflets elliptic-lanceolate to elliptic (sometimes obovate-elliptic), slightly hairy to silky tomentose at least beneath. Flowers often cleistogamous. Corolla bright yellow. Pods sparsely to densely hairy, not constricted between seeds; ca. 8-14-seeded.
LL. Grassland. Rare. Flowers in the wet season.

Argyrolobium schimperianum Hochst. ex A.Rich.
Shrub covered with rusty-red or silvery hairs. Leaflets narrowly elliptic to obovate, hairy at least beneath. Corolla yellow. Pods densely hairy, constricted between seeds; ca. 6-seeded.
LL, **UL**. Bushland, grassland. Uncommon. Flowers in the wet season.
Note. Endemic to Ethiopia.

Lotus discolor E.Mey.
Perennial herb with appressed or spreading hairs, often bushy. Leaflets cuneate-ovate to oblanceolate, hairy. Corolla white with pink marks. Pods smooth.
LL, **UL**. Alpine grassland, montane forest edges. Common. Flowers in the wet season.

Vermifrux abyssinica (A.Rich.) Gillett
Perennial herb with procumbent stems. Leaves imparipinnate; leaflets oblanceolate, hairy. Flowers yellowish-red. Pods smooth, transversely veined, falcate, indehiscent.
LL, **UL**. Grassland, bushland. Rare. Flowers in the wet season.

Fig. D26. – A-C, Erythrina abyssinica, *A, habit, B, inflorescence, C, dehiscent pod with seeds. – D,* Mucuna melanocarpa, *inflorescence. – E,* Crotolaria quartiniana, *inflorescence.*

A
B
C
D
E

Astragalus atropilosus (Hochst.) Bunge subsp. **atropilosus**
Perennial herb with smooth stems. Leaves imparipinnate, leaflets narrowly elliptic or lanceolate, smooth above and slightly hairy beneath. Racemes axillary, long-staked, many-flowered. Flowers yellow, less commonly pinkish or yellowish-pink. Pods smooth or dark strigulose.
LL, **UL**. Grassland. Uncommon. Flowers in the wet season.

Colutea abyssinica Kunth. & Bouché
Shrub to c. 2 m tall. Leaves imparipinnate, leaflets elliptic, smooth above and with white appressed hairs beneath. Racemes axillary, few-flowered. Flowers with standard dark reddish-brown, yellowish-green at the base. Pods papery, inflated.
LL. Rocky areas, scrub. Uncommon. Flowers in the wet season.

Trifolium simense Fresen.
Erect or sometimes decumbent perennial herb, stems smooth (or hairy above), to 40 cm long, often rooting at lower nodes. Leaves trifoliate; leaflets cuneate-oblong to linear-lanceolate, more than 5 times as long as wide. Flowers in globose or ovoid many-flowered heads c. 15 mm across. Corolla red-violet (rarely white). Calyx 17-30-veined. Pods surrounded by persistent calyx and corolla, 1-2-seeded.
UL. Stream banks; grazed grassland. Common. Flowers in the wet season.

Trifolium polystachyum Fresen.
Erect annual or short-lived perennial herb, stems to 1 m long, often rooting at lower nodes. Leaflets elliptic to oblanceolate. Flowers in oblong many-flowered heads up to 35 mm long. Corolla purple. Calyx 11-veined. Fruit as above.
LL, **UL**. Swampy grassland, stream banks. Uncommon. Flowers in the wet season.

Trifolium cryptopodium Steud. ex A.Rich.
Large mat-forming perennial herb with thick, woody rootstock and basally creeping and rooting stems. Leaflets cuneate-obovate. Flowers in globose many-flowered heads up to 60 mm across. Corolla purple to pale mauve. Calyx as above. Pods usually 1-seeded.
UL. Grassland. Common. Flowers in the wet season.

Trifolium semipilosum Fresen. var. **semipilosum**
Prostrate perennial herb with distinct taproot and prostrate stems often rooting at the nodes. Leaflets orbicular, obovate or oblong-elliptic. Flowers in globose (7-)10-25-flowered heads, peduncle often longer than the leaves. Corolla white pale pink or white with purplish centre. Pods pilose at least near tip, 2-6-seeded.
LL, **UL**. Grassland, forest edges. Uncommon. Flowers in the wet season.

Trifolium rueppellianum Fresen.
Erect or prostrate annual herb. Leaflets oblong or obovate. Flowers in globose many-flowered heads c. 17 mm across, on long peduncles. Corolla purple (rarely white). Pods usually 2-3-seeded.
LL, **UL**. Rocky areas, scrub. Uncommon. Flowers in the wet season.

Trifolium baccarinii Chiov.
Erect or prostrate annual herb with glabrous stems to 50 cm long. Leaflets elliptic or obovate. Flowers cleistogamous, in long-pedunculate, globose many-flowered heads. Corolla purple to whitish. Pods 2-seeded.
LL. Grassland, woodland. Uncommon. Flowers in the wet season.

Fig. D27. – A, Astragalus atropilosus, *part of plant with inflorescences. – B-C,* Colutea abyssinica, *B, flowers, C, fruits (not fully mature). – D-E,* Trifolium *spp.; D,* T. simense, *inflorescences, E,* T. cryptopodium, *habit.*

A
B
C
D
E

Trifolium calocephalum Fresen.
Perennial herb with stems to 50 cm long, rooting at lower nodes. Leaflets oblanceolate or elliptic. Flowers in 4-8-flowered heads. Corolla dark purple. Pods 7-10-seeded.
UL. Rocky areas, stream banks. Uncommon. Flowers in the wet season.
Note. Endemic to Ethiopia.

Trifolium acaule Steud. ex A.Rich.
Small rhizomatous herb with tap-root. Leaflets obcordate or oblanceolate. Flowers in 1-5-flowered heads. Corolla mauve or blue-violet. Pods 2-4-seeded.
UL. Grassland, Erica *fore*st. Common. Flowers in the wet season.

Trifolium multinerve A.Rich.
Erect or procumbent annual herb, with stems to 30 cm long. Leaflets oblanceolate. Flowers in 1-6(-8)-flowered ± pedunculate heads. Calyx 20-30-veined, lobes as long as or slightly longer than tube (3-4 mm long). Corolla purple. Pods 5-9-seeded.
LL, **UL**. Grassland, moist places. Uncommon. Flowers in the wet season.

Trifolium elgonese Gillett
Small procumbent annual herb with stems to 15(-30) cm long. Leaflets cuneate-obovate. Inflorescences 1-2-flowered. Calyx c. 25-veined, lobes distinctly shorter than tube (2-2.5 mm long). Corolla purple. Pods 6-seeded.
LL, **UL**. Wet open places in forest and grassland. Uncommon. Flowers in the wet season.

Trifolium schimperi Thulin
Erect, glabrous annual herb with stems to 35 cm long. Leaflets linear. Inflorescences in 1-5-flowered, short-pedunculate. Calyx c. 25-veined, lobes c. 8 mm long. Corolla orange- red. Pods 8-15-seeded.
LL, **UL**. Grassland, damp areas. Uncommon. Flowers in the wet season.
Note. Endemic to Ethiopia.

Trifolium steudneri Schweinf.
Small glabrous annual herb with stems up to 60 cm long. Leaflets narrowly elliptic. Flowers in globose 10-20-flowered heads up to 13(-20) mm across. Calyx c. 40-veined, lobes 2-3 mm long. Corolla purplish. Pods c. 4-seeded.
UL. Damp areas. Rare. Flowers in the wet season.

Trifolium arvense L.
Erect small annual herb with stems 4-40 cm long. Leaflets linear-oblong. Flowers in ovoid or oblong many-flowered heads, c. 20 mm long. Corolla whitish or pink, much shorter than calyx. Pods 1-2-seeded.
LL. Grassland. Uncommon. Flowers in the wet season.

Medicago polymorpha L.
Weakly spreading hairy annual herb. Leaves pinnately trifoliate; leaflets cuneate-obovate. Flowers in 2-5-flowered racemes. Corolla yellow, soon deciduous. Pods flattened or shortly cylindrical, usually indehiscent and spirally coiled.
LL. Weed in pasture or cultivation. Common. Flowers in the wet season.

Medicago minima (L.) Bartal.
Softly hairy annual herb. Leaflets obovate. Flowers in 1-6(-8)-flowered racemes. Corolla yellow. Pods subglobose, otherwise as above.
LL (?UL). In pasture land, road sides. Common. Flowers in the wet season.

SALICACEAE (99)

Deciduous trees or shrubs usually growing near freshwater or along streams and lake edges. Leaves alternate, simple, with stipules. Flowers unisexual, each flower subtended by

Fig. D28. – A-D, Trifolium *spp. – A-B,* T. acaule*, A, habit, B, flowers; C-D,* T. schimperi*, C-D, growth form variation, stunted individual in D.*

1 or 2 minute glands or scales (in *Salix*), small. Inflorescences erect or pendulous spikes or catkins; male and female on separate plants (plants dioecious). Sepals and petals absent or reduced to 2 nectary scales. Male flower with 2 or more free or united stamens, a pistillode present or absent. Female flower with sessile or shortly stalked superior and 1-chambered ovary with many ovules; stigmas usually forked or 4. Fruit a capsule breaking into 2 to 4 parts (valves). Seeds with a tuft of white silky hairs.

Salix mucronata Thunb. (syn. *S. capensis* Thunb., *S. subserrata* Willd.)
Small tree to 10 m long with dark grey fissured bark; twigs often reddish with age. Leaves oblong-elliptic, narrowly ovate or lanceolate, shiny above and glaucous beneath, simple. Flowers in terminal cylindrical catkins. Male flowers with 6-8 stamens; filaments woolly at base. Female flowers with cyathiform or horseshoe-shaped nectary scale: ovary with deeply bifid stigma.

LL. Swampy areas, along streams. Locally common. Flowers in the wet season.

MYRICACEAE (100)

Trees or shrubs. Leaves alternate, simple, without stipules (in *Myrica*), dotted with aromatic peltate glands. Flowers unisexual, male and female on same or separate individuals (plants monoecious or dioecious), in stiff spikes borne in the axils of leaves. Perianth absent. Male flower with very short, free filaments, subtended by 1 or 2 bracts, without a pistillode. Female flower with a superior, 1-chambered ovary, with a single ovule per chamber; style 2-branched; stigmas 2. Fruit a drupe with a whitish waxy covering and often rough or warty.

Myrica salicifolia A.Rich.
Tree or shrub to 15 m long with rounded crown, stems with grey bark; twigs glandular. Leaves oblong-lanceolate to oblong-elliptic, with golden yellow glands on both surfaces, aromatic (spicy smell) when crushed. Flowers in catkins. Fruit ellipsoid globose to subglobose, 3-4 mm across.

LL. Montane forest, along stream banks. Common. Flowers in the wet season.

ULMACEAE (102)

Trees or shrubs. Leaves alternate, distichous, stipulate, simple, base often with unequal (oblique) sides, 3(-5)-veined from the base (in Ethiopia). Flowers bisexual or unisexual (plants polygamous), small, regular or sometimes irregular, solitary or in axillary cymes or clusters. Sepals 4-6(-8), free. Petals absent. Stamens same number as the sepals and opposite them, filaments free. A pistillode usually absent in male flower. Ovary with 1, rarely 2 chambers and 1 ovule per chamber; styles 2, divergent. Fruit a (thinly fleshy) drupe or a samara (not in Ethiopia).

Celtis africana Burm.f.
Deciduous tree to c. 25 m tall with smooth, grey bark; slash cream to yellow with brown speckling, turning brownish. Leaves ovate to ovate-lanceolate, asymmetrical at base, with serrate margin. Flowers male, female or hermaphrodite, in axillary cymes. Fruit 5-8 mm long, yellow to orange, covered with hairs.

LL. Along stream. Rare. Flowers in the wet season.

Note. Leaves and fruits are a good diet of the Black and White Colobus Monkey.

MORACEAE (104)

Trees, shrubs or herbs with tubers (*Dorstenia* in Simen), with milky latex or watery sap. Leaves alternate, simple or palmately compound or lobed (not in Simen), with early falling stipules. Flowers tiny, unisexual, enclosed in a hollow, vase-like receptacle ('fig,' *Ficus*) or on one side of a disc-shaped structure (*Dorstenia*), or in dense heads or spikes (not in the Simen). Sepals 4 or none, rarely 2 to 6, often becoming fleshy in fruit (not in Simen). Male flower with 4, 2 or 1 stamens, as many as sepals and opposite them, with or without a pistillode. Female flower with a superior or inferior and 1-chambered ovary, 1 ovule per chamber, styles 2 or 1. Fruit a small nut or drupe enclosed in the persistent perianth or immersed or enclosed in the fleshy receptacle.

Fig. D29. – A-B, Salix mucronata, *A, habit, B, young fruits. – B-E,* Myrica salicifolia, *C, habit, D, fruiting branch, E, fruits. – E,* Celtis africana, *branch with young fruits.*

A
B
C
D
E
F

1 Perennial herb with subterranean tubers ..... *Dorstenia barnimiana*
Trees or shrubs ..... 2 (*Ficus*)

2 Figs always in leafless panicles on the main stem or older branches ..... *Ficus sur*
Figs in axils of young branches 3

3 Trunk buttressed 4
Trunk without distinct buttress 5

4 Trunk irregularly shaped with a diameter of up to ca.1.5 m ..... *Ficus vasta*
Trunk ca. 3.5 m in diameter ..... *Ficus sycomorus* subsp. *gnaphalocarpa*

5 Tree up to 20 m high; leaves not lobed; subsessile figs single in leaf axils .....
..... *Ficus vallis-choudae*
Shrub or small tree not more than 5 m high; at least some leaves variously lobed; figs 1-2, on distinct peduncle, in leaf axils ..... *Ficus palmata*

Dorstenia barnimiana Schweinf.
Perennial herb with subterranean tuber; leaves and inflorescences apparently arising directly from ground. Leaves petiolate, reniform, cordate or palmate (shape often variable during the season). Receptacles 1-2 together, with many appendages evenly distributed along the margin, green or tinged purplish brown.

LL. Rocky areas. Rare. Flowers at the beginning of the wet season.

Ficus palmata Forssk.
Shrub or small tree to c. 5 m long, young branches with purplish brown bark. Leaves ovate, at least some variously lobed, palmately veined. Figs axillary, 1-2 together, on distinct peduncle, globose to obovoid, pinkish purple when ripe.

LL. Along streams. Locally common. Flowers in the wet season.

Ficus sycomorus L. subsp. **gnaphalocarpa** (Miq.) C.C.Berg
Tree up to 30 m tall, buttressed, trunk up to 3.5 m in diameter, crown spreading; bark grey-brown or yellow; slash pale brown, yellow or pink. Leaves leathery, dull, often hairy below, broadly ovate, elliptic or suborbicular, with 4-8 lateral veins; stipules cover buds, grey or brown, falling soon. Figs 1-2 together in leaf axils of young branches, ripening after the leaves fall.

LL. Wooded grassland, forest edges. Uncommon. Flowers in the dry season.

Note. Subspecies *sycomorus* has figs on special leafless, clustered, pendent branches on the trunk or branches.

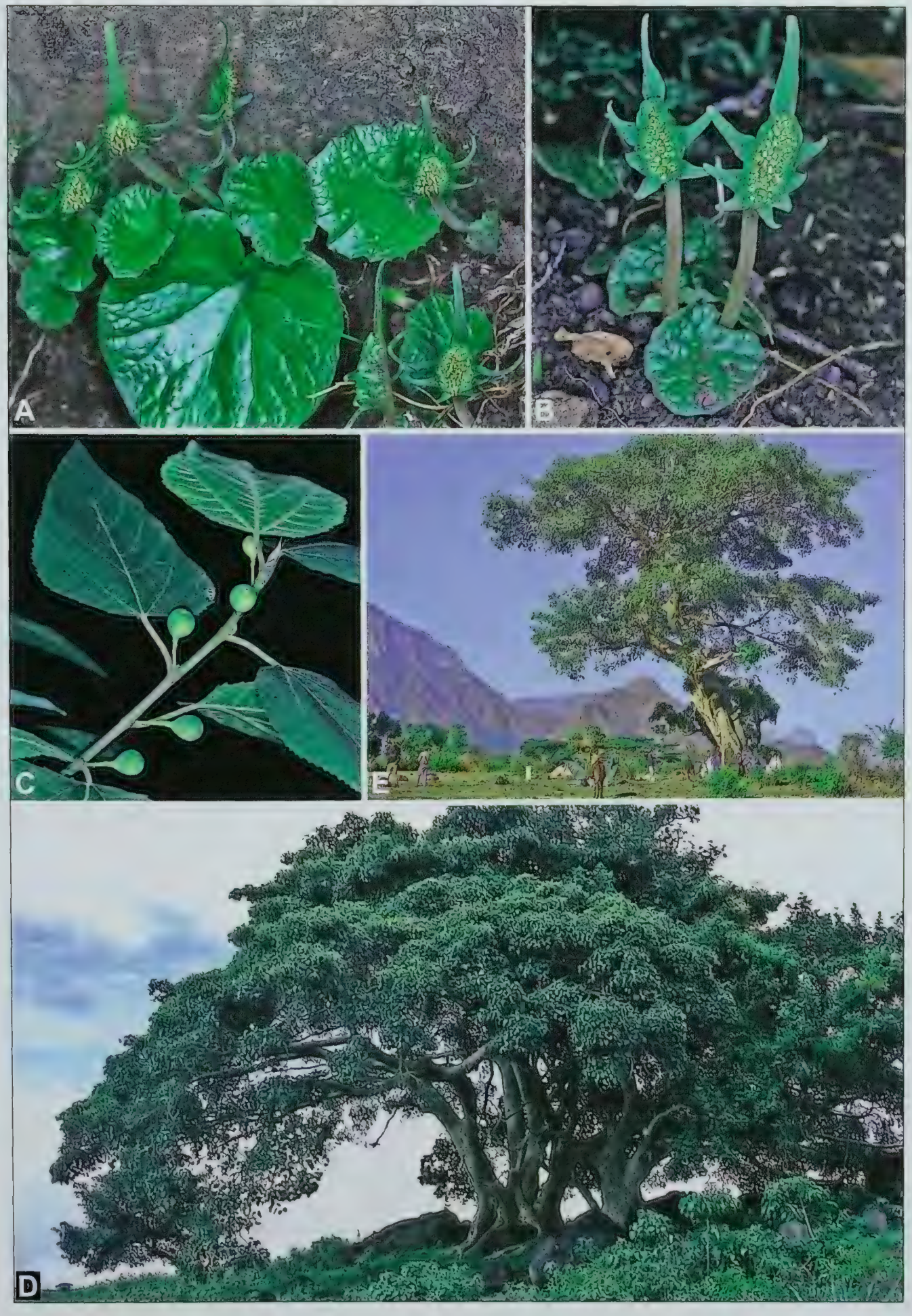
Ficus vasta Forssk.
Tree up to 20 m tall with spreading crown, trunk irregularly shaped with a diameter of up to ca. 1.5 m, ± buttressed; bark smooth, grey; young branches with brown bark, hairy. Leaves papery, alternate, elliptic, broadly ovate or suborbicular, with glandular tissue at the leaf base; stipules hairy. Figs 1 to few in leaf axils on young branches, globose, hairy or sometimes warty; ostiole prominent, 2-lipped.

LL. Open woodland or farmland; forest margins. Uncommon. Flowers in the dry season.

Ficus sur Forssk.
Tree to 25 m tall with brownish to grey bark and trunk with a diameter of c. 1 m; slash greenish to pink. Leaves ovate to elliptic or oblong to lanceolate, base rounded, truncate or subcordate. Figs always in leafless panicles on the main stem or older branches, orange-grey when ripe.

LL. Wooded grassland, montane and riverine forests. Locally common. Flowers in the dry season.

Fig. D30. – A-B, Dorstenia barnimiana, *A, habit, B, detail. – C-E,* Ficus *spp.; C,* F. palmata, *branch showing stalked figs; D,* F. vasta, *habit; E,* F. sur, *habit.*


A
B
C
E
D

Ficus vallis-choudae Del.
Tree to c. 20 m tall with grey bark; slash crimson. Leaves broadly ovate to almost orbicular, base broadly cuneate, rounded or cordate. Figs single in leaf axils, short ovoid to globose, whitish or grayish, on stout short peduncles.
LL. Riverine forest, scrub. Locally common. Flowers in the dry season.

URTICACEAE (105)

Annual or perennials herbs or occasionally shrubs (*Debregeasia*) or climbers (*Urera*), sometimes with stinging hairs. Leaves alternate, rarely opposite, simple and often palmately veined, with stipules, rarely absent (not in Simen). Inflorescences cymose, often with dense flower clusters, subtended by involucral bracts. Flowers minute, regular, greenish, unisexual, rarely bisexual, with one whorl of tepals. Male flowers: tepals (1-)3-5, stamens as many as and opposite the tepals, filaments bent inward in bud; rudimentary ovary often present. Female flowers: tepals 3-5, free or united, often unequal; ovary superior, 1-chambered, with 1 erect basal ovule. Fruit an achene, often enclosed by the dry perianth.

1 Erect much branched shrub ..... *Debregeasia saeneb*
Creeping herbs or woody climber 2

2 Woody climber up to 15 m long ..... *Urera hypselodendron*
Herbs 3

3 Creeping or scrambling herb without stinging hairs ..... *Droguetia iners*
Erect herb with stinging hairs 4

4 Leaves alternate and bullate (distinctly raised between veins) ..... *Girardinia bullosa*
Leaves opposite and not raised between veins ..... *Urtica simensis*

Urtica simensis Steud.
Erect, almost unbranched dioecious herb to c. 1 m tall, covered with large stinging hairs. Leaves opposite, ovate, base rounded to subcordate; stipules broadly ovate to triangular. Inflorescences axillary, to 5 cm long, 4 at each node.
LL. Disturbed places. Common. Flowers in the wet season.
Note. Endemic to Ethiopia.

Urera hypselodendron (A.Rich.) Wedd.
Dioecious woody climber to c. 15 m long, stems with adventitious roots on the older parts and stinging hairs on younger parts. Leaves alternate, ovate to obovate, base rounded to subcordate, usually smooth on both sides; stipules broadly triangular to lanceolate, fused, intrapetiolar. Inflorescence a lax cyme, usually with stinging hairs; male flowers pedicellate, females subsessile. Achenes enclosed by fleshy, orange or red perianth.
LL. Forest remnants. Locally common. Flowers in the wet season.

Girardinia bullosa (Steud.) Wedd.
Erect monoecious herb to 3 m tall, with large stinging hairs. Leaves alternate, ovate to cordate, bullate (blades distinctly raised between veins); stipules fused, intrapetiolar. Male inflorescences ± branched panicles to 20 cm long, female less branched and more condensed.
LL. Forest edges, clearings. Common. Flowers in the wet season.

Debregeasia saeneb (Forssk.) Hepper & Wood
Erect monoecious or dioecious shrub to c. 2 m tall, without stinging hairs. Leaves alternate, lanceolate, leathery, distinctly discolorous due to white cobwebby (arachnoid) tomentum beneath; stipules linear, fused, intrapetiolar. Male inflorescences usually solitary, few-flowered; female inflorescences several together, many-flowered. Fruits orange-red and berry-like due to the perianth becoming fleshy; enclosed achenes crowned by remnants of the wilted stigma.
LL. Along river banks. Common. Flowers in the wet season.

Fig. D31. – A, Urtica simensis. – *B-C*, Urera hypselodendron, *B, habit, C, fruiting inflorescences. – D-E*, Girardinia bullosa, *D, habit, E, female inflorescences. – F-G*, Debregeasia saeneb, *F, habit, G, leaves.*

Droguetia iners (Forssk.) Schweinf.
Mostly monoecious perennial herb with creeping or scrambling and erect branched stems to c. 1.2 m long. Leaves opposite, ovoid; stipules lanceolate, mostly persisting. Flowers in involucrate. Achenes compressed, enclosed in slightly enlarged involucrum.
LL. Montane forest floor. Uncommon. Flowers in the wet season.

CELASTRACEAE (108)

Trees or shrubs, with or without thorns. Leaves alternate or opposite, simple; stipules minute. Flowers bisexual or functionally unisexual, small, regular, white or greenish, with a fleshy, nectar-secreting disc surrounding the ovary. Sepals 4 or 5, usually free. Petals 4 or 5, free. Stamens free, as many as and alternating with the petals, arising from the margin of the disc. Ovary superior but partly sunken into the disc, 2-3-locular (in *Maytenus*); style short, 2-3-lobed. Fruit a fleshy 5-valved capsule or drupe. Seeds often ± enclosed in a brightly coloured, fleshy aril, with or without endosperm.

1 Plant without thorns ..... *Maytenus undata*
Plants with distinct thorns 2

2 Thorns relatively short, up to 2 cm long; cymes up to 3-flowered ..... *Maytenus cortii*
Thorns much longer, 4-7 cm long; cymes up to 30-flowered ..... *Maytenus arbutifolia*

Maytenus cortii (Pic.-Serm.) Cufod.
Shrub with thorns to c. 2 cm long; branches dark grey with white lenticels. Leaves ± orbicular, leathery. Flowers up to 3 in each cyme. Capsule light brown with green spots. Seeds dark brown, glossy; aril dirty white to yellow, covering one side of seed only.
LL. Montane forest, along streams. Locally common. Flowers in the dry season.
Note. Endemic to the Simen.

Maytenus arbutifolia (A.Rich.) R.Wilczek var. **arbutifolia**
Shrub to c. 5 m tall, with thorns 4-7 cm long, branches grey, brown or sometimes black, hairy. Leaves variably shaped (elliptic or oblong-oblanceolate, ovate or orbicular), smooth, leathery. Flowers in up to 30-flowered cymes (rarely solitary), functionally unisexual. Capsules rose-red when ripe. Seeds orange-brown, glossy, with purple, rugose arils at base.
LL. Montane forest edges, river banks; farm scrub. Common. Flowers in the dry season.

Maytenus undata (Thunb.) Blakelock
Shrub to c. 7 m tall, without thorns; branches green turning brownish without distinct lenticels. Leaves as above. Flowers in unbranched, sessile fascicles. Capsules green to purple-green or yellow. Seeds brown, gloss; aril white to orange, covering ½ to whole seed.
LL. Montane forests, scrub, river banks. Common. Flowers in the dry season.

ICACINACEAE (109)

Plants trees, shrubs or climbers (not in Simen). Leaves alternate, simple, without stipules. Flowers bisexual or sometimes unisexual, small, regular, white or greenish. Sepals 4-5, free or fused at base, rarely absent (not in Simen). Petals 4-5, free or fused. Stamens 4-5, alternating with petals. Ovary superior, 1-locular, with 2 pendulous ovules; style simple, stigma entire (in the Simen). Fruit a 1-seeded drupe.

Apodytes dimidiata E.Mey. ex Arn. var. **acutifolia** (Hochst. ex A.Rich.) Boutique
Tree to c. 20 m tall with fluted bole and smooth, grey bark. Leaves ovate to elliptic, dark green, glossy. Flowers 5-merous, in panicles; ovary smooth, asymmetrical, with lateral appendage. Drupe smooth, compressed, black, with red large and fleshy lateral appendage.
LL. Montane forest; solitary tree in cultivation. Locally common. Flowers in the wet season.
Note. Var. *dimidiata* occurs in tropical Africa, West to Nigeria, South to South Africa; it has hairy ovaries and drupes.

Fig. D32. – A-B, Maytenus undata, *immature (A) and dehisced (B) capsules showing seeds with arils. – C-F,* Apodytes dimidiata, *C-D, in dry montane forest and as solitary tree in farmland, E-F, fruits.*

LORANTHACEAE (114)

Chlorophyllous hemiparasitic shrubs growing on branches of trees and shrubs of woody dicotyledons (rarely gymnosperms), rarely growing on roots (not in Simen). Stems brittle. Leaves alternate or opposite (rarely whorled), simple, coriaceous or fleshy, sometimes falling; stipules absent. Inflorescences axillary or terminal, racemose or umbellate. Flowers hermaphrodite, regular or irregular. Sepals fused, often reduced to a lower rim. Petals red, orange or yellow, free or joined into a tube. Stamens inserted on petals; anthers basifixed. Ovary inferior, 1-chambered. Fruit a 1-seeded berry with a sticky layer outside the vascular cylinder; seeds without seed coat.

Phragmanthera macrosolen (A.Rich.) M.Gilbert

Robust shrub with distinctly red to yellow-red young shoots. Leaves dark to medium green, linear-lanceolate to lanceolate. Inflorescences up to 5-flowered, pedunculate. Bud tip with distinct winged sutures; buds yellow to orange; open flowers orange-red with red base and tip; corollas without hairs. Fruit obovoid pyriform, smooth, red, calyx not persisting.

LL. Open forest or woodland; mostly growing on *Acacia* or *Albizia*. Uncommon. Flowers in wet season.

Note. Endemic to Ethiopia.

Phragmanthera regularis (Sprague) M.Gilbert

Robust shrub, sometimes dominating canopy of the host tree. Leaves ovate, cordate at base, usually grey-green, fleshy to leathery. Inflorescences consisting of sessile ± many-flowered clusters; all parts covered by very dense red hairs. Corollas robust, with cylindrical base, covered with dense reddish- or rusty-brown indumentum. Fruit with persistent calyx, covered with red, minute hairs, sometimes smooth; flesh bright red.

LL. Margins of afromontane forest, woodland; growing mostly on *Croton macrostachyus*, *Ficus* and *Rhus*. Locally common. Flowers in dry season.

VISCACEAE (115)

Chlorophyllous hemiparasitic perennial herbs or shrubs growing on stems of woody plants. Stem green, brittle, often with articulated nodes. Leaves opposite, simple, evergreen, often reduced to scales, stipules absent. Flowers minute, unisexual, solitary, clustered at nodes or in dichasia. Male flowers: stamens free (rarely fused), pistil vestigial or lacking. Female flowers: with simple style and capitate or linear stigma; staminodes absent; ovary inferior, 1-chambered. Fruit a 1-seeded berry with a sticky layer inside; seeds without seed coat.

Viscum tuberculatum A.Rich.

Stems forming dense globose mass, less often pendent, up to 60 cm long, with rounded internodes. Leaves well developed, fleshy with veins visible only when old or dry, dull to yellow-green. Male and female flowers on the same plant at different positions (plants monoecious), arranged in a dichasia; male flowers yellow to orange; female same but with warted ovary. Fruit ovoid, warted to smooth, orange or red (rarely yellow).

LL. Dry woodland, evergreen bushland; growing on a variety of hosts e.g. *Croton macrostachyus*, *Rhus*, *Maytenus*, *Nuxia*, or *Olea europea* subsp. *cuspidata* (formerly *O. africana*). Rare. Flowers in dry season.

SANTALACEAE (116)

Shrubs or herbs, often hemiparasitic on the roots of other plants. Leaves alternate, simple, sometimes small and scale-like (*Thesium*), without stipules. Flowers bisexual or unisexual (plants dioecious; *Osyris* in Simen), small, regular, greenish or whitish. Perianth 1-whorled, tepals 3-6, free or fused at base. Stamens 3-6, opposite the tepals, filaments short and free. Ovary inferior or sometimes half-inferior, 1-chambered, with 1-3, rarely 4-5 ovules; style simple, stigma capitate or lobed. Fruit a nut or drupe, 1-seeded.

Fig. D33. – A, Phragmanthera regularis, *flowers. – B-C,* Thesium radicans, *B, fruiting plant, C, fruit. – D-E,* Osyris quadripartita, *D, habit, E, flowering branches.*

Thesium radicans A.Rich.
Prostrate rhizomatous herb; stems to c. 30 cm long, branched. Leaves linear, flattened, scale-like. Flowers in groups of 1-3 or solitary in leaf axils, white, 5-merous. Perianth campanulate. Fruit bright red and fleshy when ripe.

UL. Grassland. Common. Flowers in the wet season.

Osyris quadripartita Decn.
Dioecious shrub to c. 5 m tall, much branched, often with pendant branches. Leaves elliptic to elliptic-oblong, slightly thickened. Flowers in axillary pedunculate umbels, yellow-green. Fruit flask-shaped, bright red when ripe.

LL, **UL**. Montane forest in gullies, degraded woodland. Common. Flowers in the wet season.

RHAMNACEAE (118)

Trees, shrubs or climbers with tendrils (*Helinus* in the Simen), often with thorns or stipular spines. Leaves alternate or sometimes opposite, simple, with stipules. Flowers solitary or in fascicles, cymes or umbels, bisexual, small, regular, usually white or greenish; disc usually present. Sepals 4-5, free or partially fused. Petals 4-5 or 0, free, usually shorter than sepals and folded around stamens or embracing them, sometimes borne at the edge of cup-like receptacle or hypanthium. Stamens 4-5, opposite to petals, free. Ovary superior or sometimes inferior (sunken into the disc (*Helinus*), with 2-3-locules, each with 1 ovule. Fruit a drupe, a capsule (not in the Simen) or schizocarp (*Helinus*).

1 Plants unarmed 2
Plants armed with spines or thorns 3

2 Climber with coiled tendrils ..... *Helinus mystacinus*
Shrub or tree without tendrils ..... *Rhamnus prinoides*

3 Plants with recurved or hooked stipular spines; drupe with 1 stone ..... *Ziziphus spina-christi*
Plants with branches often thorn-tipped; drupe with 3 stones ..... *Rhamnus staddo*

Helinus mystacinus (Ait.) E.Mey. ex Steud.

Woody climber to c. 8 m long, with coiled tendrils. Leaves ovate or elliptic to orbicular, hairy, entire. Flowers in terminal and axillary umbels, hairy to tomentose, white to yellowish-green; ovaries inferior. Fruit a pendulous schizocarp with numerous glandular tubercules, splitting into 3 dehiscing cocci, releasing 3-angled black seeds.

LL. Secondary scrub, forest edges, clearings. Common. Flowers in the wet season.

Rhamnus prinoides L'Hér.

Unarmed shrub or small tree to c. 4 m tall. Leaves ovate, elliptic or oblong; stipules fall soon. Flowers solitary or in 2-5-flowered axillary fascicles, yellowish green, 5-merous; petals often absent. Fruits drupaceous, with 3 stones, turning from red to blackish purple.

LL. At edges or in clearings of montane forests; former cultivations. Locally common. Flowers in the wet season.

Note. Used to flavour local alcoholic drinks ('tela' and 'tej'); fresh branches are therefore often in seen in local markets.

Rhamnus staddo A.Rich.

As above but branches often thorn-tipped; stipules often persistent; flowers 4-merous.

LL. Montane forest, scrub-grassland. Common. Flowers in the wet season.

Ziziphus spina-christi (L.) Desf.

Shrub or small tree to c. 5 m tall, branchlets whitish, smooth and shiny, covered with many stipular spines. Leaves ovate to elliptic. Flowers in many-flowered cymes, yellowish green. Drupes with a single 2-seeded stone, yellow to red.

LL. Woodland, dry riverbeds. Common. Flowers in the wet season.

Note. Fruit edible; often seen in large quantities in local markets.

VITACEAE (119)

Erect or climbing perennial herbs or woody vines; often with tendrils opposite the leaves. Leaves alternate, simple or digitately or pedately lobed or compound, with stipules. Inflorescences opposite the leaves or from leaf axils. Flowers 4-5(-6)-merous, usually bisexual, small, regular, greenish; conspicuous disc present. Calyx lobes or subentire. Petals free or often ± united at the tips and falling as the bud opens. Stamens opposite the petals. Ovary superior, embedded in the disc. 2-locular, locules with 2 basal ovules; style simple; stigma capitate or lobes. Fruit a 1-4-seeded berry.

1 Leaves simple, petals 4, tendrils present ..... *Cissus petiolata*
Leaves 3- or 3-5-foliate, petals 4 or 5(-6), tendrils absent or present 2

Fig. D34. – A-B, Helinus mystacinus, *A, habit, B, branch with flowers and tendril. – C-D,* Rhamnus prinoides, *C, habit, D, fruits. – E-F,* Ziziphus spina-christi, *E, immature fruits, F, fruits on sale in market.*

2 Leaves 3-foliate, petals 5(-6) ..... *Rhoicissus tridentata*
Leaves 3-5-foliate, petals 4 3

3 Erect perennial herb, tendrils absent ..... *Cyphostemma molle*
Climbing herb, tendrils present ..... *Cyphostemma dembianense*

Rhoicissus tridentata (L.f.) Wild & Drummond
Scandent shrub or woody climber to c. 10 m long. covered with greyish to yellow hairs. Leaves trifoliate, leaflets broadly elliptic to obovate to orbicular, dentate. Flowers in many-flowered cymes, 5(-6)-merous, red to dark purplish. Berry red to black, globose.
LL. Secondary forest, scrub, wooded grassland. Common. Flowers in the wet season.

Cissus petiolata Hook.f.
Woody climber to 10 m, with tendrils; old stems quandrangular with 4 corky wings. Leaves long-petiolate, simple, unlobed, ovate to orbicular or cordiform, base cordate. Inflorescences many-flowered, pedunculate, pseudo-umbellate; flowers brownish red. Berry ellipsoid, black.
LL. Secondary forest, scrub. Locally uncommon. Flowers in the wet season.

Cyphostemma molle (Baker) Desc.
Erect perennial herb to c. 1 m tall with woody rootstock, covered with reddish hairs throughout, without tendrils. Leaves petiolate, (1-)3-5-foliate; leaflets elliptic, margins not recurved. Flowers in many-flowered racemes, 4-merous. Berry slightly hairy, ellipsoid.
LL. Wooded grassland, scrub. Common. Flowers in the wet season.
Note. Endemic to Ethiopia.

Cyphostemma dembianense (Chiov.) Vollesen
As above but climbing herb to c. 3 m with tendrils, all parts pubescent and sometimes with scattered stalked glands; leaflets ovate to elliptic; berry densely hairy to tomentose, ellipsoid to subglobose.
LL. Forest edge, scrub. Common. Flowers in the wet season.

RUTACEAE (120)
Trees or shrubs (in the Simen), aromatic oils present. Leaves alternate or opposite, simple or compound, with pellucid glands, without stipules. Inflorescences, various, often paniculate. Flowers regular, bisexual or sometimes unisexual by abortion, 4-5-merous. Sepals and petals free or united. Disc present, stamens inserted at its base. Ovary superior, made up of 1-5 usually fused carpels; ovules 1-2 per carpel; style mostly simple, stigma capitate or peltate. Fruit mostly fleshy and indehiscent (berry, drupe) or a capsule (not in the Simen).

Teclea nobilis Del.
Shrub or small tree to c. 3 m tall with smooth, grey bark. Leaves trifoliate (rarely unifoliate); leaflets (ob)lanceolate. Flowers in terminal and/or axillary panicles, 4-merous, sometimes polygamous, yellowish or greenish yellow. Drupe red, fusiform, 1-seeded.
LL. Moist montane forest, woodland. Common. Flowers in the wet season.

Clausena anisata (Willd.) Benth.
Deciduous shrub or small tree to c. 2 m tall with purplish brown twigs. Leaves pinnately compound; leaflets asymmetrically ovate or lanceolate to elliptic, brightly gland-dotted, strongly aromatic. Flowers in panicles, bisexual, 4-merous, cream or white. Berry globose, 2-seeded.
LL. Forest margins, secondary scrub. Common. Flowers in the wet season.

SIMAROUBACEAE (122)
Trees or shrubs containing bitter substances in leaves and stems, covered with usually simple (sometimes glandular) hairs, rarely with spines (not in Simen). Leaves pinnately compound, alternate, without stipules. Inflorescences paniculate, cymose or racemose. Flowers bisexual, unisexual or polygamous; disc present. Sepals 3-5(-6), fused at base or free. Petals 3-5(-9), free. Stamens 4-10 (rarely more), usually as many or twice as many as the petals, free. Ovary 2-5(-6 or more)-chambered. Fruit a berry or made up of drupaceous mericarps attached to fruit-carrying stalk.

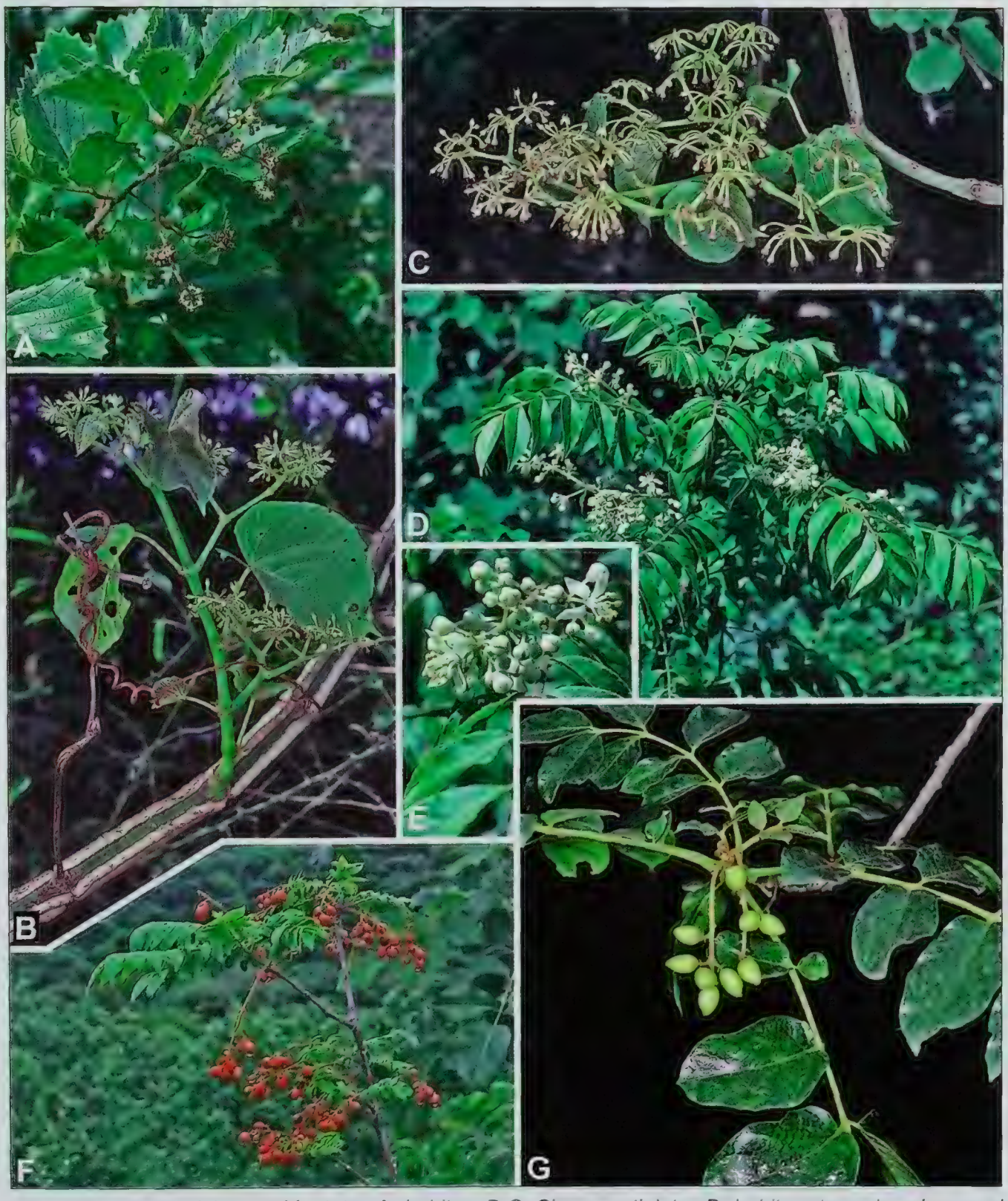


Fig. D35. – A, Rhoicissus tridentata, *A, habit. – B-C,* Cissus petiolata, *B, habit, note corky wings and tendrils, C, inflorescence after anthesis. – D-F,* Clausena anisata, *D, habit, E, flowers, F, fruits. – G,* *Brucea* antidysenterica, *fruits (immature).*

Brucea antidysenterica J.F.Mill.

Shrub or small tree to c. 5 m tall with rusty-brown haired young stems and leaves. Leaflets oblong to ovate, usually gland-dotted near margins. Flowers in spiciform panicles, unisexual. Fruit made up of 1-4 separate, fleshy mericarps, red when ripe.

LL. Montane forest, forest edges, secondary scrub. Common. Flowers in the wet season.

MELIACEAE (124)

Trees, shrubs or shrublets. Leaves alternate, simple pinnate (in the Simen), 2-3-pinnate, 1-3-foliate or simple, without stipules. Flowers usually whitish, bisexual or unisexual (dioecious in the Simen), regular. Sepals 4-6, variously united or free. Petals 4-5, free. Stamens usually 8-10, partly or completely united into a cylindrical tube around the style. Ovary superior, (2-)4-5(-20)-chambered; stigma often disc- or head-shaped. Fruit a capsule or drupe; seeds often arillate or winged.

Ekebergia capensis Sparrm.
Tree, less often a shrub to 3 m tall. Leaves imparipinnate; leaflets lanceolate to oblong-lanceolate, asymmetric at base. Flowers in panicles, unisexual (plants dioecious), white or pinkish-white, sweet-scented; stamens fused, densely bearded at throat inside, without appendages. Fruit drupaceous, with 2-4 pyrenes, deep red; seeds without arils.
LL. Montane forest, disturbed areas. Common. Flowers in the wet season.

SAPINDACEAE (125)

Trees, shrubs or climbers (not in the Simen). Leaves alternate, pinnately compound or bipinnate (not in the Simen), 3-foliate (*Allophylus*) or simple (*Dodonea*), without stipules. Flowers unisexual (but often seemingly bisexual), regular, small, with a disc outside the stamens (not in *Dodonaea*). Sepals 2-7. Petals 3-5 or absent (*Dodonaea*). Stamens 4-8 or many, arising from the disc, often hairy. Ovary superior, 2-8-chambered. Fruits various, in the Simen either a drupe or a winged capsule.

Dodonaea angustifolia L.f.
Shrub to c. 3 m tall, with all parts smooth and resinous when young. Leaves simple, narrowly elliptic to narrowly obovate, sticky when young. Flowers in terminal or axillary panicles, yellowish green. Fruit dry, capsular, with 2 reddish-tinged wings.
LL. Forest edges, secondary forests and scrub. Common. Flowers in the wet season.

Allophylus abyssinicus (Hochst.) Radlk.
Tree to c. 10 m tall with smooth, grey bark. Leaves digitately 3-foliate, leaflets elliptic to obovate. Flowers in panicles. Fruit drupaceous, subglobose, small, with transversely ellipsoid seeds.
LL. Montane forest, forest edges. Common. Flowers in the wet season.

MELIANTHACEAE (126)

Trees or shrubs. Leaves alternate, pinnately compound, often with a rounded or winged rachis, with stipules. Inflorescences racemose. Flowers bisexual or functionally unisexual, ± irregular. Sepals 4-5, somewhat unequal, fused at base or the two lower ones partially or completely fused. Petals 5, free, unequal, clawed. Stamens 4-6, free or somewhat connate. Ovary superior, 4-5-chambered, each locule with 1-4 ovules; style simple; stigma small or capitate. Fruit a capsule. Seeds large.

Bersama abyssinica Fresen.
Shrub or small tree to 5 m tall. Leaves often > 0.5 m long, imparipinnate, rachis winged or not, leaflets lanceolate to ovate-oblong. Flowers in erect racemes to 30 cm long, sweetly scented, creamy-white. Capsules woody, reddish-pink, 4-5-valved. Seeds bright red with yellow-orange aril.
LL. Tickets, scrub, degraded forest remnants. Scattered. Flowers in the dry and wet season.

Fig. D36. – A, Dodonaea angustifolia, *A, habit, B, fruits. – C,* Allophylus abyssinicus, *habit. – D-F,* Bersama abyssinica, *D, inflorescences, E, detail, F, flowers.*

A
B
C
D
E
F

ANACARDIACEAE (127)

Trees, shrubs or suffrutices, producing gums, resin or latex. Leaves alternate, pinnately compound or 3-foliolate, without stipules. Inflorescences racemose, sometimes spicate; flowers often in clusters. Flowers small, greenish or yellowish to white, regular, unisexual (although non-functional parts of other sex usually present; plants dioecious, monoecious or polygamous), mostly 4-5-merous. Sepals united at base. Petals free. Stamens as many or twice as many as petals, inserted on or around annual disc. Ovary superior, 1-4(5)-chambered, 1 ovule per locule; styles free or connate. Fruit a drupe with fleshy mesocarp, oily or resinous, endocarp woody or leathery, often 1-seeded by abortion.

1 Leaves 5-11-foliate; flowering leafless ..... *Lannea schimperi*
Leaves 3-foliate; flowering in leafy state 2

2 Lateral leaflets 1/2 to 2/3 as long as middle leaflet; drupe globose ..... *Rhus quartiniana*
Leaflets subequal or lateral leaflets only slightly smaller; drupe kidney- or bean-shaped ..... *Rhus glutinosa*

Lannea schimperi (A.Rich.) Engl.

Dioecious tree, 2-9 m tall, with dark grey smooth bark; twigs stout, covered with dense pink hairs when young. Leaves imparipinnate, 5-11-foliate, with pink hairs when young, later rusty hairy. Inflorescences produced before leaves in apical clusters. Male flowers in lax, relatively long inflorescences, females more condensed. Petals green to bright yellow, sometimes flushed pink, fragrant. Ovary smooth. Fruit a wine-red glabrous drupe.

LL. Woodland, secondary scrub. Uncommon. Flowers in the dry season.

Rhus glutinosa A.Rich.

Shrub or small tree to 4 m tall. Leaves trifoliate, leaflets elliptic to lanceolate, to > 20 cm long. Panicles mostly axillary, female inflorescences usually shorter than subtending petiole. Drupes ± compressed, reniform to bean-shaped.

LL. Edge of evergreen forest or scrub. Rather uncommon. Flowers in the wet season.

Note. A complex and variable species divided into several subspecies. The Simen plants belong to subsp. *glutinosa* var. *glutinosa*.

Rhus quartiniana A.Rich.

Shrub or small tree to 3 m tall. Leaves trifoliate, middle leaflet larger than the lateral ones, narrowly elliptic to oblanceolate, usually < 8 cm long. Panicles mostly terminal, lax, extending beyond leaves. Drupes globose.

LL. Wooded gullies, evergreen thicket. Uncommon. Flowers in the dry (and wet?) season.

ARALIACEAE (131)

Trees or shrubs (in the Simen). Leaves alternate, usually large, palmately lobed or compound, or pinnate; stipules present, often fused to the base of the leaf stalk. Inflorescences simple or compound, often in umbellate arrangement at the top of the shoots. Flowers bisexual (in the Simen), regular. Calyx very small or none. Petals ca. 4-6 (in the Simen), free. Stamens alternating with and as many as the petals, free. Ovary inferior, with 2 to numerous 1-ovulate locules; styles as many as locules, often joined at base to form a distinct stylopodium. Fruit a berry or drupe.

1 Leaves pinnately compound; plants leafless at flowering ..... *Polyscias farinosa*
Leaves palmately compound or lobed; flowering in leafy state 2

2 Flowers in small umbels grouped into long racemes; leaves digitately compound, leaflets stalked ..... *Schefflera abyssinica*
Flowers in simple spikes or racemes; leaves palmately lobed or compound 3

3 Leaves palmately lobed; flowers stalked ..... *Cussonia ostinii*
Leaves palmately compound; flowers sessile ..... *Cussonia arborea*

Fig. D37. – A-B, Lannea schimperi, *A, habit, B, branch with male inflorescences. – C,* Rhus quartiniana, *fruiting branch. – D-E,* Cussonia arborea, *D, habit, E, inflorescences.*

Cussonia arborea A.Rich.
Tree to 5 m tall; bark corky. Leaves palmately compound, with 3-9 (sub)sessile obovate or oblanceolate leaflets. Flowers sessile, in numerous long, simple spikes. Fruits drupaceous, ovoid.

LL. Woodland, often in rocky areas. Locally common. Flowers in the wet season.

Cussonia ostinii Chiov.
Tree up to 7 m tall; bark corky. Leaves palmately lobed, peltate; lobes 7, smooth. Flowers pedicellate, in several long racemes. Fruits drupaceous, ovoid.

LL. Woodland. Uncommon. Flowers in the wet season.

Note. Endemic to Ethiopia.

Polyscias farinosa (Del.) Harms
Tree to c. 5 m tall, leafless at flowering time; bark shiny straw-colored, with some resinous exudates. Leaves developing after flowering, pinnately compound, more than 40 cm long. Flowers in small umbels arranged on racemes. Petals pale to greenish yellow.
LL. Steep, rocky slopes in woodland. Rare. Flowers in the wet season.
Note. Endemic to Ethiopia.

Schefflera abyssinica (Hochst. ex A.Rich.) Harms
Tree to 20 m tall, rarely epiphytic. Leaves digitately compound, with 5-8 stalked, ovate or elliptic papery or ± leathery leaflets. Flowers pedicellate, in small umbels grouped into long racemes. Fruits subglobose, ribbed.
LL. Primary and secondary montane forests, wooded gullies, woodland. Rather common. Flowers in the wet season.

APIACEAE (UMBELLIFERAE) (132)

Herbs, rarely shrubs or small trees (*Steganotaenia* in the Simen). Stems often with soft pith or hollow internodes. Leaves alternate, usually pinnately or palmately compound, often finely divided, occasionally simple, forming a sheath at the base, without stipules. Inflorescence a simple or compound, flat-topped umbel, rarely head-like. Flowers bisexual, regular or sometimes zygomorphic with enlarged outer petals. Calyx greatly reduced. Petals 5, free, mostly greenish, whitish or yellowish. Stamens 5, free, alternating with the petals. Ovary inferior, 2-chambered (1 ovule in each locule), with 2 separate styles. Fruit dry, dividing into 2 parts (1-seeded mericarps) that are attached to each other by a slender stalk (carpophore). Seeds with endosperm.

1 Small deciduous trees, flowering and fruiting in leafless state ..... *Steganotaenia araliacea*
Herbs 2

2 Flowers in dense heads subtended by a conspicuous star-like involucre of white, enlarged bracts ..... *Alepidea peduncularis*
Inflorescence not as above 3

3 Creeping herb with kidney-shaped simple leaves with lobed margins ..... *Hydrocotyle sipthorpioides*
Habit and leaves not as above 4

4 Fruits with hooked bristles or glochidiate spines 5
Fruits without bristles or spines 7

5 Leaves 1-4-pinnate; umbels compound 6
Leaves ternate to palmately divided; umbels simple ..... *Sanicula elata*

6 Annual or short-lived perennial herb with slender rootstock; flowers greenish-yellow, white or whitish ..... *Agrocharis incognita*
Perennial herb with thickened rootstock; flowers dark purple to blackish ..... *Agrocharis melanantha*

7 Acaulescent or very-short stemmed perennial 8
Caulescent herbs 9

8 Leaves 5-10 cm long, 2-3-pinnate, with many pinnatisect or pinnatipartite segments, the latter mucronate at the apices ..... *Haplosciadium abyssinicum*
Leaves smaller, 1-pinnate, with a few rounded leaflets ..... *Pimpinella pimpinelloides*

9 Leaves divided in fine, filiform segments; flowers bright yellow ..... *Ferula communis*
Leaves variously divided, but not as above; flowers white or greenish-white 10

10 Fruit and ovary densely verrucose ..... *Oreoschimperella verrucosa*
Fruit and ovary glabrous, smooth 11

11 Plants glabrous; stems terete, sometimes purplish or with purple spots; all flowers regular ..... *Conium maculatum*
Plants ± hairy; stems grooved, green; lateral flowers of umblets often zygomorphic (with enlarged outer petals) ..... *Anthriscus sylvestris*

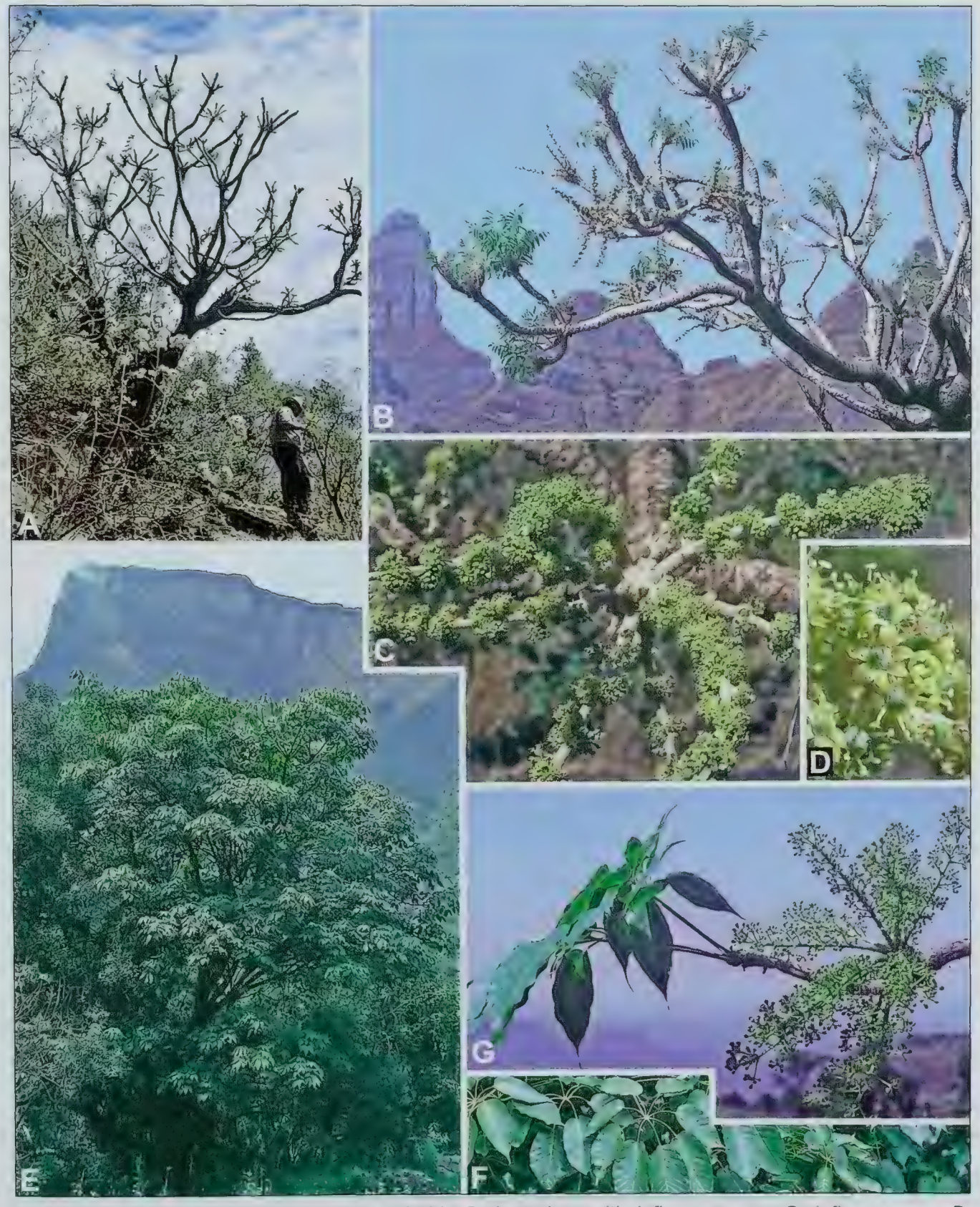


Fig. D38. – A-D, Polyscias farinosa, *A, habit, B, branches with inflorescences, C, inflorescence, D, flowers. – E-G,* Schefflera abyssinica, *E, habit, F, leaves, G, branch with inflorescences.*

Hydrocotyle sipthorpioides Lam.
Slender creeping herb rooting at the nodes. Leaves long-petiolate, blades reniform, 5-9-loed. Umbels simple, relatively few-flowered. Flowers purplish, small. Fruits ellipsoid, ribbed.
(**LL**), **UL**. Wet places. Rare. Flowers in the wet season.

Sanicula elata Buch.-Ham. ex D.Don
Glabrous herb with erect stems to c. 50 cm long. Leaves varying from ternate to palmate with 5 divisions, the median segment largest; basal rosette leaves largest, long-petiolate. Umbels small, simple, few-flowered. Flowers white or greenish. Fruits with hooked spines.
LL, **UL**. Wooded gullies, moist and shady places along streams. Common. Flowers in the dry season.

Alepidea peduncularis A.Rich.
Erect herb to c. 60 cm tall. Leaves petiolate, simple, lanceolate, with serrate margins drawn out into stiff hairs; basal rosette leaves largest. Umbels numerous, simple, head-like, subtended by up to c. 10 enlarged bracts forming a conspicuous, star-like, whitish involucre. Flowers white, pale lilac or greenish. Fruits ovoid covered by tubercles.
LL. Forest patch along stream, grassland. Locally common. Flowers in the wet season.

Agrocharis incognita (Norman) Heywood & Jury
Straggling to semi-scrambling herb; stems to c. 1.5 m long, subglabrous to hairy. Leaves 2-3-pinnate, leaflets oblong to elliptic. Umbels few-flowered, subcapitate, on peduncles much elongated in fruit. Flowers greenish-yellow, white or whitish. Fruits with glochidiate spines.
UL, **ES**. Rocky areas, along streams. Common. Flowers in the wet season.

Agrocharis melanantha Hochst.
Pubescent to subglabrous herb to ca. 50 cm tall, often with basal leaf rosette. Leaves 3-4-pinnate, leaflets linear-lanceolate. Umbels several-flowered, subcapitate, on peduncles much elongated in fruit. Flowers dark purple to blackish. Fruits with glochidiate spines.
UL. Grassland. Locally common. Flowers in the wet season.

Anthriscus sylvestris (L.) Hoffm. var. **sylvestris**
Robust biennial herb to > 1 m tall, stems grooved, hollow, hairy, at least below. Leaves 3-pinnate, to > 50 cm long, leaflets ovate, pinnatisect; leaf sheaths broadly membranous margined, smooth or hairy. Umbels terminal, umblets with mostly 5-6 oblong-lanceolate bracteolates with hyaline margin. Flowers white, lateral flowers often zygomorphic. Fruits oblong-ovoid, smooth, shining when ripe.
UL. Grassland. Common. Flowers in the wet season.
Note. A second variety, var. *nemorosa*, occurs in S Europe and SW Asia.

Conium maculatum L.
Erect, much-branched glabrous biennial herb with tuberous taproot, to > 2m tall, stems hollow, sometimes purplish or with purple spots. Leaves 2-4-pinnate, the lower ones to c. 40 cm long, the ultimate segments oblong-lanceolate, incise-serrate. Terminal umbels on short peduncles, overtopped by lateral umbels, relatively many-flowered. Flowers white, all zygomorphic; petals with inflexed apex. Fruits compressed-subglobose, glabrous.
UL. Damp to wet places, along streams. Uncommon. Flowers in the wet season.

Haplosciadium abyssinicum Hochst.
Glabrous, acaulescent geocarpic perennial herb with large, thick taproot. Leaves 2-3-pinnate, all in a basal rosette, to 10(-20) cm long, narrowly oblong; tips of ultimate segments with mucronate apices. Umbels compound, usually without distinct peduncle. Flowers (creamy-)white or sometimes pinkish; petals with inflexed margins. Fruits ovoid, glabrous; often only 1 mericarp aborted (the fertile then curved).
UL, **ES**. Moist grassland, areas of open soil (solifluction soils); sometimes in ericaceous scrub. Common. Flowers in the wet season.
Note. Monotypic; outside Ethiopia only known from the tropical East African mountains.

Fig. D39. – A, Sanicula elata, *habit. – B-C,* Alepidea peduncularis, *B, habit, C, involucrate inflorescences. – D,* Conium maculatum, *habit. – E-G,* Haplosciadium abyssinicum, *E, habit, F, dug out plants showing tap roots, and leaf rosettes, G, flowers.*

A
B
C
D
E
F
G

Oreoschimperella verrucosa (A.Rich.) Rauschert (syn. *Sium simense* Gay ex A.Rich.)
Glabrous annual or biennial herb to 2 m tall, much branched from near base; stems striate. Leaves variously pinnate, with irregularly sharply toothed margins; leaf sheaths with broad, hyaline margins. Umbels numerous, compound, on long peduncles, both bracts and bracteoles present; umblets many-flowered. Flowers white or greenish-white. Fruits subglobose, densely verrucose.

LL, **ES**, **UL**. Evergreen forest and scrub, *Erica arborea* vegetation. Uncommon. Flowers in the wet season.

Note. Endemic to Ethiopia.

Pimpinella pimpinelloides (Hochst.) Wolff
Acaulescent or very-short stemmed perennial herb with thick rootstock; stem thinly pubescent. Leaves rosette-forming, imparipinnate; leaflets few, rounded with crenate margins; petioles sheathing. Umbels compound, bracts and bracteoles absent, peduncles and pedicels hairy; umblets few-flowered. Flowers white to pinkish. Fruits oblong-ovoid, hairy at first, becoming glabrescent with age.

UL, **ES**. Afroalpine grassland; ± damp rocky areas. Rare. Flowers in the wet season.

Note. Endemic to the Simen.

Steganotaenia araliacea Hochst.
Small glabrous deciduous trees to c. 5 m tall, without leaves at flowering and fruiting time; stems with shiny grey bark. Leaves imparipinnate, crowded at the end of branches; leaflets 7-9, ovate-lanceolate, margins serrate, with the teeth ending in long stiff bristles, apex mucronate. Umbels compound, clustered at the apex of shoots; lanceolate to linear-lanceolate bracts and bracteoles present; umblets many-flowered. Flowers creamy-white to yellow. Fruits large, to c. 15 mm long, strongly dorsally compressed, smooth, with well-developed lateral wings.

LL. Steep, dry, rocky slopes in woodland or grass- and woodland mosaic. Rare. Flowers at the beginning of the wet season.

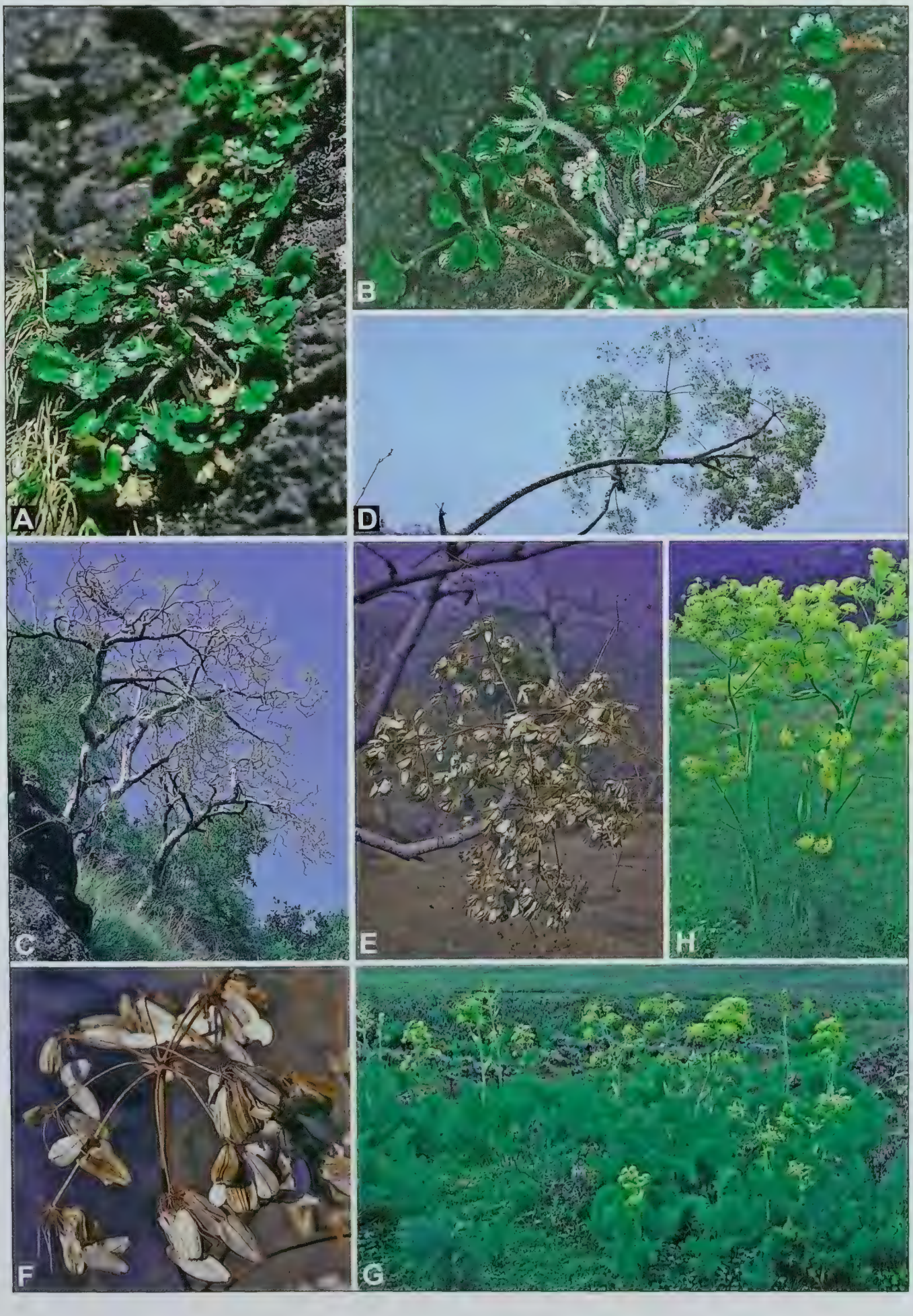
Ferula communis L.
Robust erect perennial herb to > 1 m tall; stems solid, finely striate. Basal and stem leaves large, pinnately divided, with long, fine filiform segments; leaf sheaths conspicuous and large, widely inflated; upper and inflorescence leaves much reduced, sometimes consisting of amplicaul sheaths only. Umbels compound, numerous; bracts and bracteoles mostly missing. Flowers bright yellow; petals with incurved apex. Fruit distinctly dorsally compressed, broadly obovate to broadly elliptic.

UL. Grassland, grass- and woodland mosaic; often in heavily grazed areas. Common. Flowers in the dry and wet season.

ERICACEAE (133)

Small trees, shrubs or subshrubs, often growing on acid soils. Leaves simple, alternate, opposite or whorled, without stipules. Flowers bisexual, mostly regular, in axillary or in simple or congested terminal racemes, 4-merous (in the Simen) or 5-merous. Sepals free and united, sometimes persistent in fruit. Petals united to form a short to conspicuous corolla tube, sometimes persistent in fruit. Stamens as many as the petals or twice as many; anthers opening by means of apical pores, often with appendages. Disc usually present between stamens and ovary. Ovary superior, 4-chambered (in the Simen), several ovules per locules; style simple. Fruit a capsule with numerous small seeds, remaining enclosed inside the persistent calyx and corolla (in the Simen), a berry or drupe.

Fig. D40. – A-B, Pimpinella pimpinelloides, *A, habit, B, detail. – C-F,* Steganotaenia araliacea, *C, habit, D-E, flowering and fruiting inflorescences, F, fruit. – G-H,* Ferula communis, *G, habit, H, detail.*


A
B
C
D
E
F
G
H

1 Dwarf shrubs < 1 m tall; corolla tubular; calyx and ovary pubescent; stamens 4 .... *Erica tenuipilosa* subsp. *spicata*
Shrubs or small trees, to several m tall; corolla campanulate; calyx and ovary glabrous, stamens 8 .. 2
2 Pedicels glabrous, with 2 or 3 small bracteoles; flowers regular; anthers with basal appendages .... *Erica arborea*
Pedicels glandular, with a solitary ± recaulescent bract making the flowers zygomorphic; anther without appendages ..... *Erica trimera*

Erica arborea L.
Profusely branched shrub or small tree to several m tall; stem grey-brown; young branches densely pubescent. Leaves in whorls of 3-4, linear, smooth. Inflorescences thyrsoid, terminal or intercalary panicles. Sepals ovate, smooth. Corolla white, broadly campanulate, with erect lobes. Stamens 8; anthers with a pair of basal appendages. Style stout, overtopping corolla; stigma flattened; ovary glabrous.
(**LL**) **ESC**, **UL**. Wooded (often burnt) grassland, frequently forming pure stands; steep, rocky slopes; cliffs; along streams. Common. Flowers in the wet season.

Erica trimera (Engl.) Beentje (syn. *Philippia trimera* Engl.)
Shrub or tree to sometimes > 10 m tall, with richly branched thick stems; branchlets variously hairy (short, simple and glandular hairs of different sizes). Leaves in whorls of 3, with short hairy petiole, linear, sometimes pubescent above. Flowers mostly irregular (zygomorphic) from a fully recaulescent bract. Sepals smooth or with glands at margins. Corolla campanulate, creamy white to greenish. Stamens 8; anthers without appendages. Style stout, overtopping corolla; stigma flattened; ovary glabrous.
ESC, **UL**. Steep, rocky slopes. Common. Flowers in the wet season.
Note. In habit, not easily distinguishable from the above (*E. arborea*). The dominant species in many parts of the steep Simen escarpments.

Erica tenuipilosa (Engl. ex Alm. & Fries) Cheek subsp. **spicata** Cheek (syn. *Blaeria tenuipilosa* Engl., *B. spicata* Hochst. ex A.Rich)
Dwarf shrub < 1 m tall, with numerous much-branched stems from a thickened base. Stems and branches, leaves and ovary variously hairy (short, simple and long, bristle-like and sometimes glandular tipped hairs). Leaves linear. Sepals broadly lanceolate to ovate. Corolla tubular, slightly widened at the top, pink. Stamens 4; anthers with appendages. Style slender, overtopping corolla; stigma flattened; ovary pubescent.
UL. Afroalpine grassland. Uncommon. Flowers in the wet season.
Note. Outside Ethiopia only known from Sudan. Subsp. *tenuipilosa* is confined to W Africa.

SAPOTACEAE (135)
Plants trees with milky latex or sap; young growth often with a rusty or brownish coloured indumentum. Leaves alternate, simple, often stiff and leathery, mostly without stipules. Flowers bisexual, regular, white or cream, solitary or in axillary clusters (sometimes in the axils of fallen leaves). Flowers 4-8-merous. Sepals free. Petals campanulate to shortly tubular, sometimes each lobe divided into 3 segments. Stamens as many as and opposite the corolla lobes. Ovary superior, 5- to many-locular; one ovule per locule; style simple. Fruit a berry. Seeds shiny with a broad scar, without endosperm.

Mimusops kummel DC.
A tree to c. 15 m tall; bark grey, slash pink. Leaves petiolate, ovate-oblong to obovate, glossy, up to 14 cm long. Flowers creamy-white, fragrant, 1-4 in leaf axils. Berry ellipsoid to ovoid, with acute apex (shortly beaked), orange(-red) when ripe, with a solitary seed.
LL. Riverine forest. Rare. Flowers in the beginning of the wet season.

Fig. D41. – A-G, Erica *spp.; A-C,* E. arborea, *A, habit, B, flowering individuals, C, flowers; D-E,* E. trimera, *D, habit, E, flowers; G,* E. tenuipilosa *subsp.* spicata, *G, flowering individual.*

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MYRSINACEAE (136)

Trees or shrubs. Leaves alternate, simple, ± gland-dotted, without stipules. Inflorescences cymose, umbellate, racemose or paniculate, axillary or on older wood. Flowers bisexual or unisexual, small, regular, 4-6-merous, usually marked with dark resinous dots. Sepals free or partly joined, often ciliate. Petals united below or free (*Embelia*). Stamens as many as and opposite the petals; filaments attached to the corolla. Ovary superior to inferior, 1-chambered, with few to many ovules. Fruit a berry or drupe, 1- to several-seeded.

1 Scandent or climbing shrub ..... *Embelia schimperi*
Trees or erect shrubs 2

2 Ovary inferior; fruits several- to many-seeded ..... *Maesa lanceolata*
Ovary superior; fruits 1-seeded 3

3 Leaves small, < 2 cm long, thinly coriaceous, with crenate margin ..... *Myrsine africana*
Leaves large, to > 10 cm long, leathery, with entire margin ..... *Myrsine melanophloeos*

Maesa lanceolata Forssk.

Shrub or small tree to c. 5 m tall; young branches sometimes with rusty-brown indumentum. Leaves petiolate, elliptic or ovate-elliptic, usually c. 10 cm long, margins coarsely serrate. Flowers in much-branched axillary panicles, bisexual or functionally female, 5-merous, white or cream. Ovary inferior. Fruit a several- to many-seeded globose berry crowned by persistent sepals.

LL. Montane forest edges; disturbed forest patches. Common. Flowers in the wet season.

Myrsine africana L.

Many-branched shrub to c. 2 m tall; young twigs often covered with glandular hairs. Leaves shortly petiolate, elliptic or orbicular to lanceolate, dotted with glands, glossy, thinly coriaceous, margins crenate. Flowers unisexual (plants dioecious), in axillary fascicles, 4-merous; corolla greenish-white to pinkish, dotted with glands, ciliate. Ovary superior; stigma discoid, fringed. Fruit a small 1-seeded globose berry, turning from red and purple-red to shiny black when fully mature.

LL. Montane forest and thicket; edge of scrub. Common. Flowers in the dry season.

Myrsine melanophloeos (L.) R.Br. [syn. *Rapanea melanophloeos* (L.) Mez., *Myrsine simensis* (Hochst. ex DC.) Mez.]

Tree to c. 6 m tall, with rough, fissured bark. Leaves shortly petiolate, oblong or oblong-lanceolate, mucronate to shortly acuminate at apex, tapering towards the petiole at base, glossy, thick-leathery, margins entire. Flowers bisexual or functionally female, in axillary clusters, sometimes on leafless twigs, mostly 5-merous; corolla greenish, whitish, yellowish or pinkish (yellow-red or purplish in bud), lobe margins minutely ciliate. Ovary superior; stigma conical, sometimes indistinctly lobed. Fruit a 1-seeded pink to mauve or purplish globose berry.

LL, **UL**. Montane forest; in disturbed places in *Erica-Hypericum* thicket. Relatively common. Flowers in the dry season.

Embelia schimperi Vatke

Scandent shrub or liana; stems to c. 6 m long, branches with prominent lenticels. Leaves often clustered at end of branches, petiolate, (ob)lanceolate, cuneate or ± rounded at base, margins entire. Flowers unisexual (plants dioecious), in dense axillary racemes, 4-5-merous; corolla white, creamy, greenish or yellowish. Ovary superior, stigma truncate or indistinctly lobed. Fruit a 1-seeded orange-yellow to reddish drupe with thin crustaceous endocarp.

(LL), **UL**. Montane forest. Common. Flowers in the wet season.

Fig. D42. – A-B, Maesa lanceolata, *A, habit, B, fruits (immature). – C-E,* Myrsine africana, *C-D, fruit color variation, E, male flowers (note red, exserted anthers). – F-H,* Myrsine melanophloeos, *F, habit, G, fruiting branch, H, flowers. – I-J,* Embelia schimperi, *I, habit, J, fruits (not fully mature).*

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LOGANIACEAE (137)

Trees or shrubs, sometimes climbers and herbs (not in the Simen). Leaves opposite or 3-whorled, simple, with or without stipules. Inflorescences terminal and axillary, often large and many-flowered (in the Simen). Flowers bisexual, regular, 4-5-merous. Sepals shortly united, campanulate. Sepals fused to form a tube. Sepals united. Corolla sympetalous. Stamens attached to the petals. Ovary superior, usually 2-chambered, multi-ovulate. Fruit a capsule (in the Simen) or a berry.

Buddleia polystachya Fresen.

Shrub or small tree with spreading to arching branches; young twigs 4-angled, grey- to white-tomentulose. Leaves opposite, petiolate, variable in size and shape, ovate to narrowly elliptic, discolorous (silvery beneath). Flowers in terminal, dense, elongated spike-like inflorescences, (reddish-)orange, sweetly scented. Capsule ellipsoid, basally enclosed by persistent calyx.

LL, **UL**. Degraded woodland, farmland; as isolated tree in cultivated areas. Common. Flowers in the dry season.

Nuxia congesta R.Br. ex Fresen.

Shrub or ± gnarled tree to several m tall with stringy, shredding bark. Leaves in whorls of 3, (shortly) petiolate, oblong, elliptic-oblong or obovate, coriaceous. Flowers many in terminal, congested clusters, white, strongly scented. Capsule hairy, included in the persisting calyx and barely protruding from it.

LL. Montane forest, often at forest edges. Common. Flowers in the wet season.

OLEACEAE (138)

Trees or shrubs or woody climbers (*Jasminum* in the Simen). Leaves opposite, simple, 3-foliate or imparipinnnate, without stipules. Inflorescences terminal or axillary, cymose, paniculate, dichasial, subumbellate, clustered. Flowers bisexual, regular, 4-merous (number of corolla lobes increased in *Jasminum* only). Sepals small. Corolla sympetalous. Stamens 2, attached to corolla, filaments short. Ovary small, superior, 2-celled, each locule with usually 2 apical or basal ovules; style with 2-lobed to subcapitate stigma. Fruit a drupe with a hard bony endocarp (*Olea* in the Simen), a 2-lobed berry (*Jasminum* in the Simen) or a woody capsule (*Schrebera* in the Simen). Seeds sometimes winged (*Schrebera*).

1 Trees or (erect) shrubs 3
Scrambling or climbing shrubs 2

2 Leaves pinnately compound ..... *Jasminum grandiflorum* subsp. *floribundum*
Leaves 3-foliate ..... *Jasminum abyssinicum*

3 Leaf stalk and rachis distinctly winged; fruit a wood capsule ..... *Schrebera alata*
Leaf stalk and rachis not winged; fruit a drupe 4

4 Inflorescences axillary; leaves discolorous, dark green above, pale grey-green below ..... *Olea europaea* subsp. *cuspidata*
Inflorescences terminal; leaves less distinctly discolorous ..... *Olea capensis* subsp. *macrocarpa*

Olea europaea L. subsp. **cuspidata** (Wall. ex G.Don [syn. *O. africana* Mill., *O. europaea* L. subsp. *africana* (Mill.) P.S.Green]

Tree to c. 10 m or more tall; occasionally (when browsed) short and bushy; bark dark grey, lightly fissured; stems fluted in old individuals. Leaves leathery, lanceolate to narrowly oblong-elliptic, ± glossy dark green above, pale grey-green beneath. Flowers ± many in axillary panicles, small, white. Drupe ovoid-ellipsoid, < 1 cm long, dark purple-black when ripe.

LL. (Dry) montane forest. Common. Flowers in the wet season.

Fig. D43. – A-D, Buddleia polystachya, *A, habit, B-D, inflorescences, flowers. – E-F,* Nuxia congesta, *E, flowering tree, F, fruits (immature). – G-H,* Olea europaea *subsp.* cuspidata, *G, habit, H, flowers.*

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Olea capensis L. subsp. **macrocarpa** (C.H. Wright) Verdc. [syn. *O. hochstetteri* Bak., *O. capensis* L. subsp. *hochstetteri* (Bak.) Friis & P.S.Green]
Tree to c. 20 m tall; bark grey, ± smooth. Leaves leathery, narrowly elliptic to broadly lanceolate, acute to obtuse at apex, ± glossy dark green above, paler green beneath. Flowers many in terminal panicles, small, white. Drupe ovoid to ellipsoid, 1cm or more long, dark purple-black when ripe.
LL. Montane forest, forest patch along stream. Locally common. Flowers in the wet season.

Schrebera alata (Hochst.) Welw.
Tree to c. 8 m tall; bark greyish or light brown, fissured; stem bases flutes un old individuals. Leaves mostly 5-foliate; leaflets elliptic to obovate-oblong; rachis winged, articulated at leaflet insertion. Flowers several to many in terminal panicles, sweetly scented; corolla lobes white, with brownish-purple swollen hairs near base, margins wavy. Woody capsule obovoid, releasing seeds with conspicuous subapical wings.
LL. Dry montane forest; forest remnants around cultivated areas. Uncommon. Flowers in the wet season.

Jasminum abyssinicum Hochst. ex DC.
Climber with terete branches. Leaves 3-foliate; terminal leaflet ovate to elliptic, larger than lateral leaflets and with distinct petiolule. Inflorescences terminal, cymose-corymbose, many-flowered; flowers sweetly scented, corolla white, outside flushed reddish to pink. Fruit a twinned berry (one often aborted), each globose, purple-black when fully mature.
LL. (Disturbed) montane woodland or scrub. Common. Flowers in the dry season.

Jasminum grandiflorum L. subsp. **floribundum** (R.Br. ex Fresen.) P.S.Green (syn. *J. floribundum* R.Br. ex Fresen.)
Climber with slender branches. Leaves imparipinnate (sometimes also 3-foliate on same plant), ± leathers; leaflets ovate to lanceolate, up to 9 but typically 5; terminal leaflet larger than lateral ones. Inflorescences terminal, several- to many-flowered; central flower often shorter stalked than others; flowers sweetly scented, corolla white (pinkish-red in bud). Fruit a twinned berry (one sometimes aborted), each ellipsoid, black when fully mature.
LL. Dry montane scrub. Common. Flowers in the wet season.

APOCYNACEAE (139)

Trees, shrubs or climbers with milky or watery latex. Leaves usually opposite, simple, without stipules. Inflorescences terminal or axillary, many- to few-flowered. Flowers bisexual, regular, 5-merous, often large and fragrant. Sepals free or fused at base. Corolla sympetalous, lobes twisted in bud. Stamens attached to corolla tube; anthers often coherent with the stylar head. Ovary 1-chambered or comprising 2 free carpels often united by the style. Fruits various, often a berry (in the Simen) or a capsule. Seeds in capsules often with apical tufts of long silky hairs (not in the Simen).

Acokanthera schimperi (DC.) Schweinf.
Shrub or small tree to c. 3 m tall without spines; bark soft, brown; young branches angled or ribbed. Leaves petiolate, broadly elliptic, acute to obtuse at apex, glossy, coriaceous. Flowers in axillary cymes, fragrant; corolla pink to reddish, salver-shaped, lobes white. Ovary 2-chambered with one ovule each. Fruit a 2-1-seeded ellipsoid berry, purple when ripe.
LL. (Degraded) woodland. Uncommon. Flowers at the beginning of the wet season.

Fig. D44. – A-C, Olea capensis *subsp.* macrocarpa, *A, habit, B, leaves, C, fruits (immature). – D-G,* Schrebera alata, *D, habit, E, leaves, F, flowers, G, fruiting branches and winged seeds. – H-I,* Jasminum *spp; H,* J. abyssinicum, *flowers; I,* J. grandiflorum *subsp.* floribundum, *flowers.*

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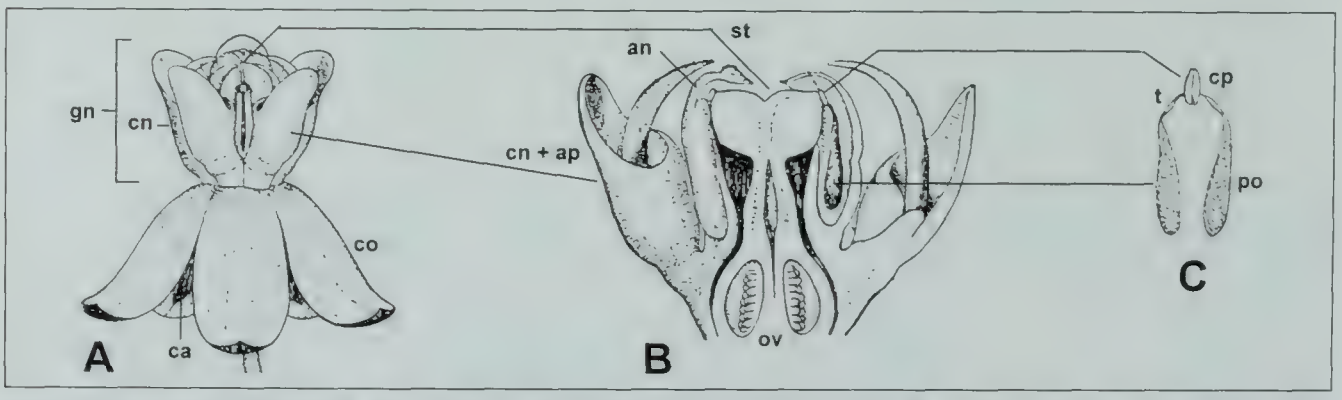
Carissa spinarum L. (syn. *C. edulis* Vahl)
Much-branched ± climbing shrub to c. 4 m long with rigid simple thorns in opposite pairs. Leaves shortly petiolate, ovate to ovate-elliptic or -lanceolate, coriaceous. Flowers in terminal clusters, sweetly scented; corolla salver-shaped, with tube wider at apex, white inside, pink to reddish outside, lobes acute. Ovary 2-chambered with 1 to several ovules each. Fruit a 2-4-seeded berry, reddish at first, turning bluish-black when ripe, edible.
LL. Degraded woodland; montane scrub. Common. Flowers in the dry and wet season.

ASCLEPIADACEAE (140)

Herbs, shrubs or climbers with milky or watery latex; mostly perennial but often with annual shoots from a tuberous rootstock. Stems herbaceous, woody or strongly succulent (*Huernia* in the Simen). Leaves opposite, simple, without stipules. Inflorescences terminal or axillary, cymose, many- to few-flowered, frequently reduced to umbelli- or racemiform clusters. Flowers bisexual, regular, 5-merous. Sepals free. Corolla sympetalous, tube short and broad to long, lobes variable in size; variously shaped *corona* often present inside the corolla. Stamens and stigma mostly united into a *gynostegium*; pollen of each anther cells mostly aggregated into *pollinia*, those from adjacent anther locules connected by *translators* (pollinia + translators = *pollinarium*). Ovary superior, made up of 2 multiovulate carpels, free except at base and apex; styles fused towards the apex and dilated into a stigmatic head. Fruits of 2 unilocular follicles (1 not infrequently aborted), releasing many, mostly compressed seeds crowned by a coma of silky hairs. – For an explanation of the terms in *italics* see the illustration below!



Parts of an Asclepiadaceae *flower (based on* Asclepias syriaca*). – A, flower in side view showing calyx (ca), corolla (co) and the gynostegium (gn) with the corona (cn) on the outside. – B, detail (longitudinal section) of gynostegium showing bicarpellate ovary (ov), free styles and stylar head (st), surrounded by anthers (an) and corona with appendages (cn + ap). – C, pollinarium, consisting of 2 pollinia (po) joined by 2 translator arms (t) to the central corpusculum (cp)*

1 Dwarf succulent herb ..... *Huernia macrocarpa*
Non-succulent plants 2

2 Erect shrubby perennial herb ..... *Gomphocarpus fruticosus* subsp. *flavidus*
Scrambling or climbing woody or herbaceous plants 3

3 Much branched liana with leathery, linear leaves and green twigs ..... *Periploca linearifolia*
Not as above 4

4 Corolla tube with a distinct, globose basal swelling, corolla lobes remaining attached at apex to form a "cage" ..... *Ceropegia sobolifera*
Corolla not as above 5

5 Leaf blades broadly ovate to suborbicular, with strongly cordate base, to > 10 cm long; follicles covered with soft spines, generally paired ..... *Pergularia daemia*
Leaves not as above (although sometimes large); follicles not covered with soft spines, paired or single 6

Fig. D45. – A-B, Carissa spinarum, *A, flowers and fruits, B, paired thorns. – C-D,* Periploca linearifolia, *C, habit, D, flowers. – E-F,* Tacazzea conferta, *E, inflorescence, F, dehisced follicles and seeds.*

6 Large lianas with many-flowered, extensive terminal inflorescences; follicles paired, slightly divergent, pendulous ..... *Tacazzea conferta*
Small twiners or climbers; inflorescences axillary or extra-axillary (not in the axils of foliage leaves); follicles single 7

7 Inflorescences sessile, axillary, 2-3-flowered ..... *Pentatropis nivalis*
Inflorescences extra-axillary, many-flowered ..... *Cynanchum abyssinicum*

Periploca linearifolia Quart.-Dill. & A.Rich
Liana up to 20 m long; old stems with greyish-smooth bark, younger parts glabrous, green. Leaves coriaceous, linear(-lanceolate), markedly attenuate at tip, glabrous. Inflorescences terminal, many-flowered, open, compound cymes. Flowers small, < 1 cm in diam.; corolla lobes hairy on margin and apex, creamy-yellow with a purplish median stripe [in Simen plants; typically violet]; corona whitish [in Simen plants; typically violet], 3-segmented, central segment long, filiform. Follicles linear-ovoid, paired, held horizontally.
LL. Scrub; edge of montane forest remnants. Uncommon. Flowers in the wet season.

Tacazzea conferta N.E.Br.
Large liana up to 20 m long; old stems with verrucose bark. Leaves (long) petiolate, ovate to oblong, base cuneate or tapering. Inflorescences terminal, many-flowered. Flowers pale green to greenish-yellow; corolla 1 to > 1 cm in diam.; corona lobes 5-9, filiform. Follicles cylindrical-ovoid, paired, slightly divergent and pendulous, to almost 20 cm long.
LL. Edge of montane forest remnants. Uncommon. Flowers in the wet season.

Gomphocarpus fruticosus (L.) Ait.f. subsp. **flavidus** (N.E.Br.) Goyder
Shrubby herb; stems woody, much branched from above the base, to > 1 m tall. Leaves linear(-lanceolate), acute at tip. Inflorescences umbel-like, several-flowered. Flowers > 1 cm in diam.; corolla lobes reflexed; corona lobes reddish-purple, conspicuous. Follicles single, ovoid, gradually tapering into an attenuate beak, inflated, with pubescent filiform processes.

LL. Disturbed rock areas. Uncommon. Flowers in the wet season.

Note. The second subspecies known from Ethiopia, subsp. *setosus*, has green corona lobes; subsp. *fruticosus* is not recorded for the country.

Pergularia daemia (Forssk.) Chiov.
Scrambling twiner with stiff, spreading hairs. Leaves (long) petiolate, broadly ovate to sub-orbicular, distinctly cordate at base, hairy. Inflorescences umbel-like, several-flowered. Corolla campanulate, lobes creamy-white to greenish, hairy at base and margins; corona differentiated into inner and outer lobes. Follicles generally paired, echinate.

LL. Edge of forest remnants, scrambling over shrubs. Rare. Flowers in the wet season.

Pentatropis nivalis (J.F. Gmel.) D.V.Field & J.R.I.Wood
Ascending twiner. Leaves elliptic, obtuse at tip, rounded at base. Inflorescences sessile with 2-3 flowers, all open at the same time. Petals fused at the base, triangular, curved, purple with yellow tip, densely haired on the upper surface. Corona shorter than gynostegium, smooth. Follicles usually single, small (ca. 5 cm long), obclavate, strongly beaked.

LL. Rocky places in dry scrub. Rare. Flowering season unknown.

Cynanchum abyssinicum Decne.
Climber up to 4 m long with appressed trichomes, woody at the base. Leaves thin, ovate, acute at tip, cordate at the base. Inflorescences extra-axillary, 15-20-flowered, 3-5 flowers open at a time. Flowers sweetly scented. Corolla brownish-purple, lobes with hairs on the upper surface; corona ivory-colored, exceeding the gynostegium, filiform above. Follicles single, obclavate, pendulous.

LL. Open scrub; secondary vegetation. Uncommon. Flowers in the wet season.

Ceropegia sobolifera N.E.Br.
Twining or trailing herb with slender rootstock. Leaves (shortly) petiolate, elliptic-lanceolate, ± leathery. Inflorescence a sessile, 1-5-flowered pseudo-umbel. Calyx lobes narrowly triangular. Corolla greenish with reddish streaks, to ca. 3 cm long, the tube with a globose basal swelling around the corona; lobes bright yellow inside, remaining attached at apex to form a "cage." Fruits unknown.

UL. In *Erica* forest; steep grassy slopes with low shrubs. Rare. Flowers in the wet season.

Note. Endemic to the Simen.

Huernia macrocarpa (A.Rich.) Sprenger subsp. **macrocarpa**
Dwarf succulent herb often forming dense clumps. Stems ascending to erect, with conical tubercles in 5 ranks. Leaves poorly defined and forming soft pointed tip to tubercle. Inflorescence from near the base of stem, cymose, few- to 1-flowered. Flowers on pedicels to ca. 1 cm long. Corolla campanulate, ca. 2 cm in diam., outside whitish, inside uniformly dark reddish-brown; corona small, blackish-purple except for some lateral bright yellow spots. Follicles > 10 cm long, on elongated pedicels to > 5 cm long.

LL. Dry rocky slopes on shallow soil. Rare. Flowers at the beginning of the wet season.

Note. Outside Ethiopia, the subspecies is only known from the Sudan and possibly Saudi Arabia. Subsp. *harerghesis*, differing in a number of floral characters, is confined to Ethiopia (Wello and Hararghe).

Fig. D46. – A-B. Gomphocarpus fruticosus *subsp.* flavidus. *A. habit. B. flowers. – C-D.* Pergularia daemia. *C. habit and flowers. D. paired follicles. – E.* Ceropegia sobolifera. *flowers. – F-G.* Huernia macrocarpa, *F, habit, G, flower.*

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RUBIACEAE (141)

Trees, shrubs or herbs. Leaves opposite (decussate) or sometimes whorled, simple. Margin entire; stipules present, inserted between the leaf stalks (interpetiolar), sometimes leaf-like and indistinguishable from the leaves (*Galium* and *Rubia* in the Simen). Inflorescences terminal or axillary, many- to few-flowered. Flowers mostly bisexual, sometimes heterostylous, regular, mostly 4-5-merous. Calyx inserted at apex of ovary, sepals fused to almost free. Corolla sympetalous, tubular to campanulate, seldom (sub)rotate. Stamens alternating with corolla lobes. Ovary inferior, mostly 2-5-locular, each carpel with many to few or a solitary ovule; style mostly simple; stigmas capitate, clavate or lobed. Fruits either dehiscent and dry (capsules), indehiscent and fleshy (drupes, less often berries), or variously modified (in the Simen dry or fleshy 1-seeded mericarps in *Galium* and *Rubia*). Seeds with mostly with copious endosperm, unwinged or sometimes winged (then from capsular fruits).

1 Herbs, "shrubby herbs" (stems woody at base) or low dwarf shrubs < 0.5 m tall 2
Trees or distinctly woody shrubs 12

2 Leaves and leaf-like stipules in (pseudo-)whorls of 4 to many; corolla always small, rotate or less commonly subcampanulate; fruits made up of 2 globose mericarps 3
Leaves opposite (decussate) or rarely in (true) whorls of 3; stipules not leaf-like and indistinguishable from leaves; corolla small to large, never rotate; fruits not as above 8

3 Leaves and leaf-like stipules distinctly petiolate; flowers mostly 5-merous ..... *Rubia cordifolia* subsp. *conotricha* var. *discolor*
Leaves and leaf-like stipules (sub)sessile; flowers mostly 4-merous ..... 4 (*Galium*)

4 Leaves (and leaf-like stipules) 3-nerved, always in whorls of 4; margins never prickly ..... *Galium thunbergianum* var. *hirsutum*
Leaves (and leaf-like stipules) 1-nerved, in whorls of 4-8; margins sometimes prickly 5

5 Mericarps distinctly fleshy ..... *Galium simense*
Mericarps dry, glabrous or with short, sometimes hooked hairs 6

6 Fruits mostly on solitary peduncles/pedicels, to c. 25 mm long ..... *Galium spurium* subsp. *africanum*
Not as above; inflorescences 1-, several- to many-flowered 7

7 Inflorescences several- to many-flowered; corolla large, ca. 4-5 mm in diam., lobes (long-)apiculate; leaves ca. 10-25 x 3-8 mm ..... *Galium aparinoides*
Inflorescences 1- or few-flowered; corolla small, ca 1-1.5 mm in diam., leaves narrower and smaller, 2-12 x 0.5-2 mm ..... *Galium acrophyum*

8 Dioecious dwarf shrubs or subshrubs, < 0.5 m tall; leaves crowded, mostly linear-lanceolate; male flowers with exserted anthers, female with exserted hairy stigmas ..... *Anthospermum pachyrrhizum*
Plants not with the above combination of characters 9

9 Creeping, often mat-forming perennial herbs; flowers solitary at nodes ..... *Oldenlandia monanthos*
Plants not with the above combination of characters 10

10 Annual herbs; flowers several to many in terminal and usually also axillary clusters ..... *Spermacoce sphaerostigma*
Perennial herbs, subshrubs or shrubby herbs; flowers relatively large and showy, in much-branched terminal many-flowered inflorescences 11

11 Flowers many in dense, corymb-like inflorescences, to 10 cm or more wide, all axes mostly velvety-rusty pubescent; calyx lobes (sub)equal ..... *Pentas schimperiana*
Flowers ± many in subcapitate to ± corymbose inflorescences to ca. 5 cm wide, inflorescences axes not velvety-rusty; inflorescence branches mostly becoming elongated and ± spike-like in fruit; calyx lobes very unequal (1-3 lobes foliaceous) ..... *Pentas lanceolata* subsp. *quartiniana*

12 Inflorescences spike-like, to 15 or more cm long, subtended by a pair of bracts; capsules with winged seeds ..... *Hymenodictyon floribundum*
Plants not with the above combination of characters 13

13 Flowers small and inconspicuous (usually not more than 1 cm in diam.) 14
Flowers large and showy (>1 cm in diam.) 15

14 Flowers white or creamy white, in much-branched, many-flowered terminal panicles ..... *Psychotria orophila*
Flowers greenish-white, greenish or yellowish, in pedunculate, ± many-flowered axillary clusters ..... *Vangueria apiculata*

15 Flowers short-tubed, white tinged pinkish, in paired axillary clusters ..... *Galiniera saxifraga*
Flowers long-tubed, never tinged pinkish, in terminal inflorescences 16

16 Flowers 6-7-merous, mostly solitary; fruits hard and leathery, ellipsoid, to 7 cm long, many-seeded ... *Gardenia ternifolia* subsp. *jovis-tonantis*
Flowers 4-merous, in terminal many- to several-flowered inflorescences; fruits drupaceous, bilobed to subglobose, much smaller, 2- to 1-seeded ..... 17 (*Pavetta*)

17 Corolla tube to ca. 10 mm long, only slightly longer than corolla lobes ..... *Pavetta gardeniifolia*
Corolla tube to at least 25 mm long, at least twice as long as corolla lobes 18

18 Calyx, outside of corolla, ovary and young fruit hairy (mature fruits becoming glabrescent); basal tubular part of calyx very short and indistinct, not as wide as ovary below ..... *Pavetta oliveriana*
Calyx, outside of corolla, ovary and fruit glabrous; basal tubular part of calyx distinctly wider than ovary below ..... *Pavetta abyssinica*

Psychotria orophila Petit

A shrub or small tree, 2-3 m tall; stems glabrous. Leaves elliptic or elliptic-oblong, glabrous; stipules to > 1cm long, ovate(-elliptic), thin, bifid at tip. Flowers white, in extensive pedunculate terminal panicles. Drupe red when fully mature. Pyrenes 5-grooved on dorsal side.

LL. In gullies and along streams in montane forest. Rare. Flowers in the wet season.

Note. New record for the Simen.

Fig. D47. – A-B, Psychotria orophila*, A, habit, B, stipule, C, flowers, D, fruits (immature).*

Pentas lanceolata (Forssk.) Defl. subsp. **quartiniana** (A.Rich.) Verdc.
Perennial herb, subshrub or shrublet to 2 m tall; stems mostly erect, often with leafy short shoots. Leaves ovate to lanceolate or elliptic, to > 10 cm long and 5 cm wide, hairy; stipular sheath with several to many bristles. Inflorescence mostly many-flowered, made up of several ± congested or slightly elongated branches (subcapitate or ± corymbose); inflorescence branches mostly becoming elongated and ± spike-like in fruit. Flowers mostly lilac, pink or mauve; sepals very unequal, 1-3 enlarged and foliaceous. Capsule ovoid, many-seeded.

LL. Edge of montane forest, secondary montane scrub, grassland, wooded grassland, woodland, farmland. Common. Flowers in the wet season.

Pentas schimperiana (A.Rich.) Vatke subsp. **schimperiana**
Shrubby herb or soft-wooded shrub to ca. 3 m tall; younger parts densely rusty-brown pubescent. Leaves ovate to ovate-lanceolate, to 15 cm or more long and > 5 cm wide, rusty-brown hairy at least on veins below; stipular sheath large, conspicuous, with ca. 6-10 bristles. Inflorescence many-flowered, ± corymbose, 10 cm or more wide, all parts velvety-rusty pubescent. Flowers white tinged pink on the outside or pinkish; sepals (sub)equal. Capsule ovoid, many-seeded.

LL. Edge of montane forest, montane scrub, bushland; generally in sunny places. Common. Flowers in the wet season.

Note. Another subspecies, subsp. *occidentalis* (with shorter calyx lobes), occurs mostly in W Africa.

Oldenlandia monanthos (A.Rich.) Hiern
A scrambling, creeping or sometimes mat-forming perennial herb; stems 3-30 cm long, occasionally rooting at nodes. Leaves shortly petiolate, elliptic to elliptic-lanceolate, small (< 2 cm long) mostly ± smooth; stipular sheath with several short bristles. Flowers solitary in leaf axils, pink or purplish-pink, violet, blueish or whitish, short-tubed, small (hardly > 5 mm in diam.) Capsule ellipsoid, many-seeded.

LL, **UL**. Montane and afroalpine grassland, including heavily grazed and trampled areas. Common. Flowers in the wet season.

Spermacoce sphaerostigma (A.Rich.) Vatke [syn. *Arbulocarpus s.* (Hochst.) Tennant]
Erect annual herb to ca. 30 cm tall; stems often much-branched, 4-angled, (long-)hairy. Leaves elliptic-lanceolate to linear-lanceolate hairy, subsessile; stipular sheath with several bristles. Flowers 4-merous, several to many in terminal and usually also axillary clusters, to ca. 2 cm in diam.; cluster subtended by a pair of foliage leaves. Corollas mauve, purplish, lilac, blueish or whitish, tubes broadly funnel-shaped. Capsule ovoid, hairy at least above, splitting from the base upwards; the 2 valves held together by the persistent calyx, coming off like a lid, leaving behind the septum and the 2 seeds.

LL. Rocky areas in wooded grassland, edge of secondary scrub, mostly in disturbed areas. Common. Flowers in the wet season.

Anthospermum pachyrrhizum Hiern
Dioecious rounded to cylindrical dwarf or subshrub, < 0.5 m tall. Leaves narrowly lanceolate to linear-lanceolate, often seemingly in much larger numbers at nodes due to much-contracted leafy short shoots. Flowers greenish-yellow to pale yellow, in several- to few-flowered axillary clusters; corollas minute; anthers exserted in males, stigmas in females. Fruits dry, splitting into 2 indehiscent mericarps, crowned by persistent calyx.

LL, **UL**. Mostly in cracks of rocks in cliffs, occasionally in rocky grassland. Common. Flowers in the wet and dry season.

Fig. D48. – A-D, Pentas *spp; A-B*, P. lanceolata *subsp.* quartiniana, *C-D*, P. schimperiana; *A,C, habit, B,D flowers. – E-F*, Oldenlandia monanthos, *E, habit, F, flowers. – G-H*, Spermacoce sphaerostigma, *G, habit, H, flowers. – I*, Anthospermum pachyrrhizum, *habit.*

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Rubia cordifolia L. subsp. **conotricha** (Gand.) Verdc. var. **discolor** (Turzc.) K.Schum.
Perennial scrambler, stems to c. 4 m long, 4-angled, with recurved prickles. Leaves in whorls of 4, long-petiolate, lanceolate to broadly ovate. Inflorescences along the stems and terminal, usually many-flowered. Flowers small, mostly 5-merous, yellow, creamy yellow, yellowish-green or greenish; corolla distinctly campanulate, lobes apiculate or acuminate. Fruits comprised of 2 subglobose, fleshy 1-seeded mericarps, shiny black when fully ripe.

LL. In scrub, bush clumps, remnants of montane forest; mostly in ± disturbed areas. Uncommon. Flowers in the wet season.

Note. Subsp. *conotricha* refers to African material of the widely distributed Afro-Asiatic *R. cordifolia*; var. *conotricha*, with ± rotate corollas, is occurs mostly outside Ethiopia.

Galium thunbergianum Eckl. & Zeyh. var. **hirsutum** (Sond.) Verdc.
Straggling or procumbent perennial with hairy stems. Leaves in whorls of 4, 3-nerved, ovate to elliptic, (sparsely) hairy. Inflorescences many-flowered, (broadly) pyramidal. Flowers greenish to yellowish, small (ca. 2 mm in diam.). Mericarps dry, subglobose, densely covered with white hooked hairs.

UL. Rocky outcrops or bush clumps in grassland, often along streams. Uncommon. Flowers in the wet season.

Note. Var. *thunbergianum* is distinguished by having (nearly) glabrous stems and leaves.

Galium acrophyum Hochst. ex Chiov. (syn. *G. hochstetteri* Pichi-Serm., *G. simense* A.Rich., non Fresen., nom. illeg.)
Small mat-forming herb with prostrate to ascending stems. Leaves in whorls of (5)6, 1-nerved, (ob)lanceolate to linear, small (to ca 1 cm long). Flowers 1 to few in leaf axils, white, very small (ca. 1 mm in diam.). Fruits comprised of 2 dry 1-seeded dark brown to blackish mericarps; the latter glabrous or sparsely covered with short hooked hairs.

UL. Afroalpine grassland, often along watercourses. Rare. Flowers in the wet season.

Note. Outside Ethiopia only known from the high tropical E African mountains.

Galium aparinoides Forssk.
Straggling or scrambling perennial with coarse recurved prickles on the 4-angled stems. Leaves in whorls of 6, 1-nerved, oblanceolate, elliptic or oblanceolate, to ca. 2.5 cm long, acuminate to mucronate at apex, margins and mid vein below with coarse recurved prickles. Inflorescence many- to several-flowered. Flowers often reddish-purplish tinged, yellowish-green, greenish or pale yellow, to ca. 0.5 cm in diam. Fruits as above but mericarps always covered with short whitish hooked hairs.

LL. Edge of montane forest, in clearings; secondary montane scrub. Common. Flowers in the wet season.

Galium simense Fresen.
As above but leaves narrowly oblanceolate and in whorls of 4-8 and always glabrous fruits comprised of dark purple to black fleshy mericarps.

UL. Shady, wet areas and wooded gullies; disturbed areas (scrub, farmland, etc.). Common. Flowers in the wet season.

Galium spurium L. subsp. **africanum** Verdc.
Weak scrambling annual; stems with recurved prickles on the 4 angles. Leaves in whorls of 6-8, 1-nerved, oblanceolate to linear-(ob)lanceolate, to 4 cm long, margins and midvein below with coarse recurved prickles. Most of flowers/fruits solitary on unbranched peduncles arising from leaf axils. Corolla white to greenish or yellowish-green, very small (to ca. 1.5 mm in diam.). Mericarps black, dry, covered with hooked hairs.

UL. Disturbed areas. Common. Flowers in the dry season.

Note. Subsp. *spurium*, with more extensive inflorescences, is a widespread weed of European origin.

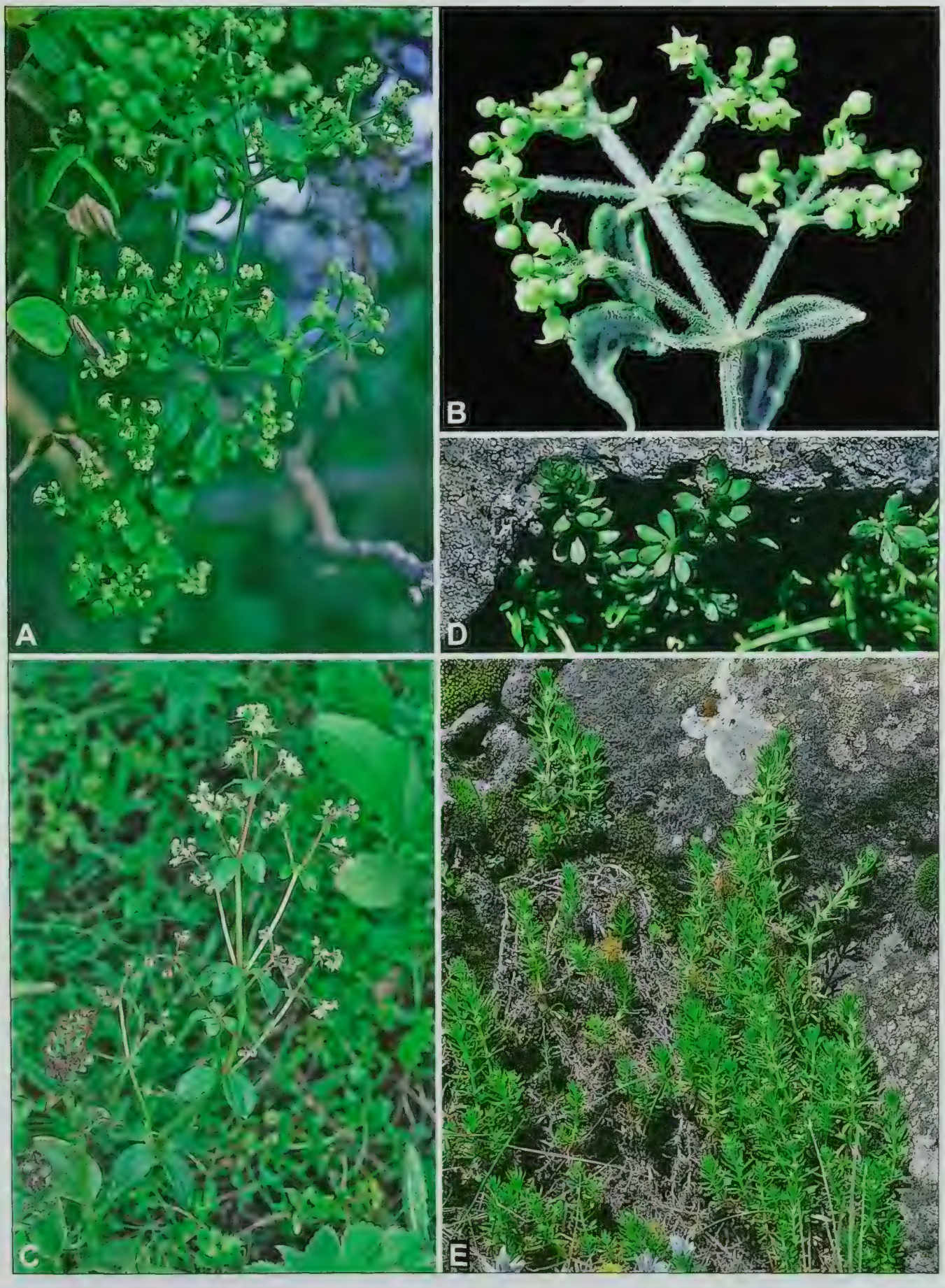

Fig. D49. – A-B, Rubia cordifolia *subsp.* conotricha *var.* discolor, *A, habit, B, inflorescence. – C-E,* Galium*; C,* G. thunbergianum *var.* hirsutum, *habit; D,* G. acrophyum, *habit; E,* G. simense, *habit.*

Hymenodictyon floribundum (Hochst. & Steud.) Robinson
Small tree to ca. 6 m tall. Leaves obovate to elliptic, glossy, young and old foliage often reddish. Stipules papery, falling soon. Flowers dark red to brownish, many in spike-like inflorescences supported by 2 lanceolate bracts. Capsule dark brown, verrucose. Seeds winged.
LL. Rocky outcrops in woodland. Rare. Flowers in the wet season.

Gardenia ternifolia Schumach. & Thonn. subsp. **jovis-tonantis** (Welw.) Verdc.
Small tree to ca. 5 m tall (smaller, shrubby and gnarled, if browsed). Leaves in whorls of 3, oblanceolate, mostly on short branchlets. Flowers white or creamy (yellowish with age), solitary; corolla lobes 6-7, tube to 6 cm long. Fruits brownish, hard, ellipsoid, to > 5 cm long.
LL. Woodland, wooded grassland. Uncommon. Flowers in the wet season.
Note. Subsp. *ternifolia*, has glabrous rather than hairy young shoots

Galiniera saxifraga (Hochst.) Bridson (syn. *G. coffeoides* Del.)
Shrub or small tree to 3 m tall, with paired, decussate branches. Leaves elliptic oblong to ± lanceolate, glossy green above. Flowers fragrant, in paired axillary clusters; corolla subrotate, white tinged pinkish. Drupe reddish and fleshy at first, becoming brownish and hard.
LL. Montane forest and scrub, often near streams. Rare. Flowers in the wet season.

Pavetta oliveriana Hiern
Shrub or small tree to ca. 2-3 m tall; young branches hairy. Leaves elliptic to (ob-)lanceolate, hairy below. Flowers fragrant, white, many, in corymb-like inflorescences (sometimes terminal on leafless lateral branches); corolla tube pubescent, to ca. 2.5 cm long, very much longer than corolla lobes; calyx, ovary and young fruit hairy. Drupe becoming glabrescent with age, shiny black, crowned by persistent calyx.
LL, **UL**. Wooded gullies; woodland patches . Locally common. Flowers in the dry season.

Pavetta abyssinica Fresen. var. **abyssinica**
Similar to the above in vegetative and floral features but generally more glabrous. Inflorescences more compact and ± head-like. Calyx, outside of corolla, ovary and fruit glabrous.
LL. Montane forest, often at edge; bush clumps. Common. Flowers in the wet season.
Note. Several ill-defined varieties, distinguished by calyx lobe length and indumentum, are recognized; Simen material is best placed in the "typical" variety (var. *abyssinica*).

Pavetta gardeniifolia A.Rich.
Shrub or small tree to c. 3 m tall; branches mostly glabrous. Leaves decussate or occasionally in whorls of 3, obovate, elliptic or lanceolate, glabrous, bacterial nodules more conspicuous that in the species above. Inflorescences often ± lax and terminal on very short leafless lateral branches. Flowers glabrous; corolla yellowish-green to dull yellow, tube only to ca. 10 mm long, only slightly longer than corolla lobes. Drupe shiny black, glabrous.
LL. Deciduous and evergreen bushland; in bush clumps. Rare. Flowers in the wet season.

Vangueria apiculata K.Schum.
Shrub or small tree to 4 m tall, young parts glabrous. Leaves elliptic- or ovate-lanceolate to lanceolate, smooth. Flowers ± many, in congested, shortly pedunculate axillary clusters. Corolla greenish-white, greenish or yellowish, glabrous outside, tube hairy inside, short, lobes (much) longer than tube and (long-)apiculate. Calyx lobes ± band-like, often curved, as long as or longer than corolla tube. Drupe with 5 hard stones, globose, to 3 cm in diam. when fully mature.
LL. Rocky areas along streams. Uncommon. Flowers in the beginning of the wet season.

Fig. D50. – A, Hymenodictyon floribundum, *young inflorescences. – B-C*, Gardenia ternifolia *subsp.* jovis-tonantis, *B, flowering, C, fruits. – D*, Galiniera saxifraga, *habit (and fruits). – E-H*, Pavetta *spp.; E*, P. oliveriana, *flowering; F-G*, P. abyssinica, *flowering; H*, P. gardeniifolia, *immature fruits. – I*, Vangueria apiculata, *inflorescences with immature fruits.*

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VALERIANACEAE (143)

Annual or perennial herbs, sometimes woody at the base, often with strongly scented rhizomes. Leaves opposite, without stipules, pinnately divided, sometimes entire. Flowers in often dense, bracteate cymes, bisexual (in the Simen), irregular to almost regular, 5-merous. Sepals small or absent at flowering time, sometimes enlarging with maturing fruit, forming pappus. Corolla sympetalous, usually spurred or saccate at base, lobes 3-5-fid, oblique or 2-lipped. Stamens 1-4, alternating with petals. Ovary inferior, 3-chambered, only 1 chamber fertile. Fruit a 1-seeded achene, often crowned by persistent calyx.

Valerianella microcarpa Lois.

Small, dichasially branched annual herb. Leaves sessile, spathulate to oblong, predominantly entire, glabrous. Flowers sessile in clusters at the end of branches, very small. Corolla white to pale pink, funnel-shaped, with 5 unequal lobes (3 larger than the others); stamens 3, included or slightly exserted. Achenes minute, ovoid.

(LL), **UL**. Rocky grassland, along streams. Rare. Flowers in the wet season.

DIPSACACEAE (144)

Annual or perennial herbs, sometimes subshrubs (not in the Simen). Leaves opposite, simple, entire or dissected, without stipules. Inflorescence a dense involucrate head with sessile flowers; outer flowers often enlarged. Flowers 4-5-merous, bisexual, ± irregular, somewhat 2-lipped, with a single cup-shaped involucel (epicalyx) below the calyx. Sepals usually very small, sometimes with long bristles. Corolla sympetalous, irregularly lobed. Stamens 2-4, alternating with the corolla lobes. Ovary inferior, 1-chambered with 1 ovule. Fruit a 1-seeded achene, surrounded by the involucel and crowned by the persistent calyx.

Dipsacus pinnatifidus A.Rich.

Erect perennial herb to > 2 m tall; high altitude forms stunted, only a few cm high; stems often angular. Leaves pinnatipartite to entire; basal leaves large, petiolate, to 25 cm long, stem leaves sessile, much smaller. Inflorescences terminal and lateral, consisting of 1 to several pedunculate involucrate heads with 1-2 rows of foliaceous, spine-tipped bracts. Flowers white to creamy white. Achenes ± 4-angular, crowned by persistent calyx.

ESC, **UL**. Ericaceous scrub; Afroalpine grassland. Common. Flowers in the wet season.

Note. Plant sizes dramatically decrease with increasing altitude; above ca. 3,600 m plants are almost stemless; only the peduncles lift the flowering heads a few cm above the ground.

Scabiosa columbaria L.

Perennial herb to ca. 0.5 m tall with thick rootstock. Leaves markedly heterophyllous, entire or deeply pinnatifid; lower leaves entire to crenate or lobed, upper leaves much more dissected. Flowers many in pedunculate, involucrate heads. Flowers lilac or mauve, rarely pinkish, corollas of flowers marginal on heads often enlarged and with more unequal lobes. Achenes with orbicular involucel and crowned by persistent calyx with elongated bristles.

UL. Grassland, *Erica* forest and scrub, often in rocky areas. Common. Flowers in the wet season.

ASTERACEAE (COMPOSITAE) (145)

Herbs or shrubs, rarely trees; sometimes with milky lated. Leaves alternate, sometimes opposite, simple or compound, variously shaped, without stipules. Flowers small, united into a head (*capitulum*) subtended by an involucre of 1- to many-seriate overlapping bracts. Capitula variously arranged, sometimes compound heads (1-flowered capitula in globose heads: *Echinops* in the Simen). Flowers bi-, unisexual or sterile; commonly 5-merous. Marginal or all flowers of a head strap-like and zygomorphic (ligulate flowers), central flowers regular (disc flowers). Calyx (referred to as *pappus* in this family) modified into scales, bristles, hairs, or absent. Corolla sympetalous. Stamens 5, with anthers united into a

Fig. D51. – A, Valerianella microcarpa, *habit. – B-F,* Dipsacus pinnatifidus, *B, habit, C-D, inflorescences, E-F, stunted high altitude forms, E, flowering, F, fruiting. – G,* Scabiosa columbaria, *flowering.*

tube around the style with 2-lobed stigma. Ovary inferior, 2-carpellate but 1-locular. Fruit indehiscent, dry, 1-seeded (an achene or *cypsela*), often crowned by the pappus.

The family is generally divided into 2 subfamilies, the **Asteroideae** and the **Cichorioideae**. Many representatives of the latter are distinguished from the former by being herbs with white latex and only ligulate flowers that usually have 5 minute teeth at the apex of the corolla.

Subfamily Cichorioideae

The following tribes of the subfamily are represented in the Simen:

Tribe Cardueae: *Echinops, Carduus, Cirsium, Plectocephalus*

Mostly herbs, often with spiny and winged stems. Leaves pinnatifid or incised, variously hairy, often spinescent. Heads solitary or in corymbs; all flowers ligulate or marginal flowers zygomorphic (heads *homogamous* or *heterogamous*), or all flowers tubular (heads *disciform*). Achenes crowned pappus made up of multi- to 1-seriate bristles or scales.

1 Heads compound, terminal and globose ..... 2 (*Echinops*)
Heads not as above 5

2 Shrub or a small tree to ca. 4 m tall; heads mostly creamy white ..... *Echinops longisetus*
Herbs; heads not as above 3

3 Heads without spines ..... *Echinops giganteus*
Heads with pungent spines 4

4 Leaves deeply pinnatifid, with narrow segments, each ending in a spine ..... *Echinops macrochaetus*
Leaves pinnatisect with deeply lobed segments, each ending in a long, pungent spine ..... *Echinops buhaitensis*

5 Acaulescent perennial with a basal rosette of spiny leaves ..... *Carduus schimperi*
Not as above; plant with well developed stems 6

6 Stems without wings; leaf margin without spines; disc florets pale yellow ..... *Plectrocephalus varians*
Stems winged; leaf margin with spines; disc florets white, lilac, pink or purple 7

7 Heads solitary; pappus feathery 8
Heads several aggregated together; pappus smooth or rough but not feathery 10

8 Stem interruptedly winged ..... *Cirsium straminispinum*
Stem regularly winged 9

9 Leaf margins with spines up to 2 cm long, upper surface often with stiff bristles ..... *Cirsium vulgare*
Leaf margins with spines < 1 cm long, upper surface thinly arachnoid tomentose .... *Cirsium schimperi*

10 Stem green with white stripes ..... *Carduus nyassanus*
Stem without white stripes 11

11 Leaves with erect spines up to 4 cm long; individual heads ca. 2.5 cm wide . *Carduus macracanthus*
Leaves with spines to ca. 5 mm long on the margins; individual heads to ca. 1 cm wide ..... *Carduus leptacanthus*

Echinops longisetus A.Rich.
Shrub or a small tree to ca. 4 m tall; lower parts of stems to ca. 5 cm in diam. and naked, leaves confined to the younger stem parts. Leaves narrowly elliptic in outline, to almost 0.5 m long, deeply lobed to pinnatisect. Heads on distinct peduncles, ca. 5 cm in diam., without spines. Flowers mostly creamy white, sometimes red, pink or purple-violet.

LL, **ESC**, **UL**. Montane forest edges, open woodland, *Erica*(-*Hypericum*) forest; often in ± disturbed sites. Common. Flowers in dry season.

Note. Endemic to Ethiopia.

Echinops giganteus A.Rich.
Erect, mostly unbranched perennial herb to 1 m tall. Leaves oblanceolate in outline, to ca. 30 cm long, lobed to deeply and unequally pinnatifid, segments spinous. Head solitary, to ca. 7 cm in diam., without spines. Flowers white (sometimes violet tinged), pale lavender-blue or bluish.

LL. Secondary wood- and bushland. Uncommon. Flowers in the wet and dry season.

Echinops macrochaetus Fresen.
Much-branched, bushy perennial herb to ca. 2 m tall. Leaves ± elliptic in outline, to ca. 20 cm long, deeply pinnatifid, ultimate segments narrow, ending in spine. Heads pedunculate, to ca. 5 cm in diam., with some exserted, stiff, pungent spines. Flowers white to bluish.

LL, **UL**. Disturbed open ground on rocky slopes. Uncommon. Flowers in the dry season.

Echinops buhaitensis Mesfin
Perennial herb up to 40 cm tall with a very spiny appearance due to each leaf segment ending in a long, pungent spine. Leaves to ca. 20 cm long, pinnatisect with deeply lobed segments. Head solitary, to ca. 4 cm in diam., with some exserted, stiff, pungent spines. Flowers white.

Fig. D52. – A-H, Echinops *spp.; A-B*, E. longisetus, *habit; C-D*, E. giganteus, *C, habit, D, head; E-G*, E. macrochaetus, *E, habit, F, detail, G, head with spines; H*, E. buhaitensis, *habit.*

UL. Afroalpine grassland. Rare. Flowers in the wet and dry season.
Note. Endemic to the Simen.

Carduus schimperi Sch.Bip. [syn. *C. chamaecephalus* (Vatke) Oliv. & Hiern]
Acaulescent perennial herb with long, white or brown taproot. Leaves in basal rosette, elliptic in outline, to ca. 20 cm long, pinnatisect, margins of segments with up to 8 mm long spines. Heads several or only 1, sessile at the centre of leaf rosette, each ca. 2.5 cm wide. Flowers (pale-)lilac to whitish. Achenes light brown, obovate, with multiseriate pappus.
LL, **UL**. Grassland, *Erica* bushland. Common. Flowers in the wet season.

Carduus macracanthus Sch.Bip. ex Kazmi
Erect perennial herb to ca. 1 m tall with very spiny appearance; stems winged. Leaves ovate-lanceolate in outline, to ca. 35 cm long, pinnatisect; segments with up to 4 cm long erect yellow spines. Heads sessile, clustered at tip of stem and branches, each ca. 2,5 cm wide. Flowers lilac. Achenes black or dark-brown, with white pappus.
UL. Afroalpine grassland, often in rocky areas. Uncommon. Flowers in the wet season.
Note. Endemic to Ethiopia.

Carduus nyassanus (S.Moore) R.E.Fr.
Erect spiny herbs to ca. 1 m tall; stems green with white stripes, longitudinally winged throughout. Leaves narrowly oblanceolate in outline, to ca. 40 cm long, pinnately divided, margins of segments with many spines, close to 1 cm long. Heads several clustered at tip of stem and branches, sessile and congested, each ca. 1 cm diam. Flowers white to pale pink. Achenes obovate, brown streaked with dark brown, with light brown pappus.
UL. Rocky areas along streams. Locally common. Flowers in the wet season.

Carduus leptacanthus Fresen.
Erect, usually unbranched perennial herb up to 2 m tall; stems winged throughout, wings densely covered with spines. Leaves oblanceolate in outline, to ca. 50 cm long, pinnatilobed to pinnatisect, with yellowish-brown spines to ca. 5 mm long on the margins. Heads several, sessile, densely aggregated at the tip of branches and main stem, each ca. to ca. 1 cm in diam. Flowers purple-red or pink. Achenes obovate, brown streaked with black, with whitish pappus ca. 1.5 cm long.
UL. Ericaceous scrub, open grassy areas. Uncommon. Flowers in the wet season.

Cirsium schimperi (Vatke) C.Jeffrey ex Cufod.
Erect, bushy perennial herb to 2 m tall; stems narrowly winged. Leaves oblanceolate in outline, to ca. 40 cm long, pinnatilobed with 3-angular lobes, margins with spines < 1 cm long, upper surface thinly arachnoid tomentose. Heads solitary, sessile to shortly pedunculate, ca. 2.5 cm in diam. Flowers white, pale pink to purple. Achenes light brown streaked with black, with light brown plumose pappus to ca. 1.5 cm long.
LL. Often along watercourses, on rocky ground. Uncommon. Flowers in the wet season.

Cirsium straminispinum C.Jeffrey ex Cufod.
Erect perennial herb; stems branched toward tip, interruptedly winged with orbicular lobes. Leaves oblanceolate to elliptic in outline, to ca. 15 cm long, pinnatifid, margins with spines to 1.5 cm long. Heads solitary, sessile to shortly pedunculate, ca. 1-1.5 cm in diam. Flower color unknown. Achenes unknown; pappus plumose, light brown.
LL. Montane grassland. Very rare. Flowers in the wet season.
Note. Endemic to Ethiopia; outside the Simen only recorded from Tigre.

Cirsium vulgare (Savi.) Ten.
Erect perennial herb to > 1 m tall; stems densely branched below, winged. Leaves oblong-lanceolate in outline, to ca. 25 cm long, pinnatisect, margins with spines up to 2 cm long, upper surface often with stiff bristles. Heads erect, solitary, to 5 cm in diam. Flowers pink or purple. Achenes oblong, with white plumose pappus to ca. 3 cm long.
LL. Disturbed areas such as fallow land, etc. Common. Flowers in the wet season.

Fig D53 – A-G. Carduus *spp., A-C.* C schimperi. *A. habit. B. heads. C. achenes with pappi (dry season); D-F,* C macracanthus. *D. habit. E. aggregated heads. F. detail; G.* C nyassanus. *habit*

Plectocephalus varians (A.Rich.) C.Jeffrey ex Cufod.
Perennial herb with usually several ascending stems up to 1 m tall from a short rhizome. Leaves (sub)sessile, elliptic to oblanceolate, margins entire to denticulate, to ca. 30 cm long. Heads long pedunculate, solitary, to ca. 3 cm wide (at base), up to 10 cm above (including marginal florets). Ray florets conspicuously enlarged, white to pale pink or purple, sterile; disk florets bisexual, tubular, pale yellowish. Achenes oblong, light brown, with subplumose to scabrous light brown pappus to 1 cm long.

LL. Grassy areas in montane forest, grassy slopes. Common. Flowers in the wet season.

Note. Endemic to Ethiopia.

Tribe Lactuceae: Crepis, Dianthoseris, Lactuca, Sonchus
Herbs with milky juice, stemless and with large tap root or with stems, sometimes climbing. Leaves simple to pinnatisect, alternate. Heads homogamous and perfect, ligulate, yellow, rarely white, pink or blue. Receptacle usually smooth, rarely with paleae (*Crepis* in the Simen). Pappus of erect bristles and/or soft feather-like hairs, white or yellow-white.

1 Plants acaulescent 2
Plants with distinct stem 5

2 Single head sessile in the basal leaf rosette; leaves with distinct broad yellow mid rib ..... *Dianthoseris schimperi*
Not as above 3

3 Dwarf perennial with thick, woody taproot; heads sessile, several in cushion-shaped inflorescence; flowers blue ..... *Launaea rueppellii*
Scapose perennial herbs; flowers yellow 4

4 Heads mostly solitary (rarely several) on a leafless scape; ligules of ligulate flowers very small (ca. 5 mm long) ..... *Crepis carbonaria*
Heads several in lax, open cymes on the scape; ligules of ligulate flowers twice as large (10 mm or more long) ..... *Crepis rueppellii*

5 Erect perennial herbs, or perennial with a few ascending or decumbent stems < 0.5 m long 6
Perennial herbs with straggling or climbing stems or profusely branched perennial with slender branches 10

6 Flowers bright blue to almost white ..... *Lactuca inermis*
Flowers yellow 7

7 Heads in compound corymbose cymes ..... *Crepis schultzii*
Heads solitary or 2-4 per stem 8

8 Plant with erect stem to 75 cm tall ..... *Crepis achyrophoroides*
Plants only up to ca. 40 cm tall 9

9 Stem leaves pinnatifid; ligules of ligulate flowers to ca. 2 cm long ..... *Crepis tenerrima*
Stem leaves denticulate; ligules of ligulate flowers < 1.5 cm long ..... *Crepis xylorrhiza*

10 Leaves pinnately compound; herbaceous climber to 5 m long ..... *Lactuca paradoxa*
Leaves not compound; not climbers 11

11 Heads solitary or rarely 2-3 at the tip of branches; densely branched herb, usually hanging from rock crevices, stems to 40 cm long ..... *Sonchus melanolepis*
Heads many, in densely aggregated cymes; stems straggling, to 2 m long ..... *Sonchus bipontini*

Crepis tenerrima (Sch.Bip.) R.E.Fr.
Perennial (rarely annual) herb with taproot. Stems up to 40 cm long, ascending or decumbent. Leaves both basal and on the stem, spathulate, to 15 cm long, simple or, on the stem, lyrately pinnatifid. Heads on long peduncles, cylindric-campanulate, solitary or 2-3 per stem. Involucral bracts brown tomentose and with long black non-glandular hairs. Ligule of ligulate flowers 17-22 mm long, yellow. Achenes brown, narrowed at tip or beaked, 10-ribbed; pappus ca. 5 mm long, made up of pale brown persistent, barbellate, bristles.

Fig. D54. – A-B, Plectocephalus varians, *A, head from above, B, in side view.*

UL. Grassland; grassy areas in *Erica* bushland or forest. Common. Flowers in the wet season.

Note. Endemic to Ethiopia.

Crepis xylorriza Sch.Bip. ex Babc.

Possibly only a (high altitude) form of *C. tenerrima*. Distinguished mainly by its smaller size (to 15 cm) and denticulate stem leaves, and by having smaller ligules (10-13 mm long).

UL. Afroalpine grassland. Rare. Flowers in the dry season.

Note. Endemic to the Simen (if accepted as a species).

Crepis schultzii (Hochst. ex A.Rich.) Vatke

Perennial herb up to 1 m tall, with stout, woody taproot; stem often unbranched except in the inflorescence region, leafy from base to apex. Leaves simple, ovate-oblong to lanceolate, to 25 cm long, with denticulate margins and yellow glandular setiform hairs. Heads (shortly) pedunculate, erect, cylindric-campanulate, in compound corymbose cymes. Involucral bracts densely pilose with often black glandular or non-glandular hairs. Ligule of ligulate flowers ca. 15 mm long, yellow. Achenes brown, beaked at apex, 10-13-ribbed, with yellowish-white, barbellate pappus ca. 5 mm long.

LL. Montane forest. Rare. Flowers in the wet season.

Note. Within Ethiopia, largely confined to the Gondar Floristic Region; outside the country only recorded from Uganda.

Crepis carbonaria Sch.Bip.

Acaulescent, scapose perennial herb with deep-seated, fleshy taproot. Rosette leaves numerous, simple or pinnatifid, to 15 cm long. Flowering shoot to ca. 30 cm long. Heads mostly solitary (rarely several). Involucral bracts with a median row of black hairs. Ligule of ligulate flowers 5-6 mm long, yellow, reddish tinged on the outside. Achenes brown, with a slender beak at apex, 10-13-ribbed, with yellowish-white, barbellate pappus ca. 5 mm long.

UL. Grassland, stream banks. Uncommon. Flowers both dry and wet season.

Crepis rueppellii Sch.Bip.

Acaulescent, scapose perennial herb with stout, fleshy taproot. Rosette leaves numerous, simple, oblanceolate, to 20 cm long, margins denticulate to lobulate. Flowering shoot to ca. 35 cm long. Heads cylindric-campanulate, several in lax, open cymes. Involucral bracts variously hairy. Ligule of ligulate flowers 10-13 mm long, yellow, sometimes reddish-purple

on the outside. Achenes light brown, narrowly beaked at apex, 10-15-ribbed, with white, barbellate pappus ca. 5 mm long.

UL. Grassy mountain slopes and stream banks. Common. Flowers in wet and dry season.

Crepis achyrophoroides Vatke

Perennial herb up to 75 cm tall, with deep-seated taproot and erect stem. Leaves mostly near base of stem, simple, oblanceolate to narrowly elliptic, to 30 cm long, hairy on both sides with yellow hairs or smooth, margins sinuately dentate and denticulate. Heads campanulate, 2-3 per branch. Involucral bracts sparsely covered with long yellowish-white hairs and with a median, single row of black hairs. Ligule of ligulate flowers 16-18 mm long, yellow. Achenes light to reddish brown, with a beak at apex, ca. 20-ribbed, with yellowish-brown, barbellate pappus ca. 7-8 mm long.

UL. Afroalpine grassland. Rare. Flowers in the wet and dry season.

Note. Endemic to Ethiopia.

Dianthoseris schimperi Sch.Bip. ex A.Rich. [syn. *Nannoseris s.* (Sch.Bip. ex A.Rich.) Hedb.]

Acaulescent perennial herb with thick, deep-seated taproot. Rosette leaves numerous, simple, linear to spathulate, to 7 cm long, with denticulate margins or pinnatilobed, usually with conspicuous, broad yellowish mid rib. Head solitary, (sub)sessile, in the centre of the leaf rosette, many-flowered. Ligule of ligulate flowers < 5 mm long, yellow. Achenes brown, ca. 20-ribbed, with white, bristle-like pappus ca. 10 mm long.

UL. Afroalpine grassland, often in loose soil and in moist to wet places. Locally common. Flowers in the dry and wet season.

Lactuca paradoxa Sch.Bip. ex A.Rich.

Perennial herbaceous climber with milky juice; stems to 5 m long, often forming a dense, tangled mass, shoots repeatedly, divaricately branched. Leaves pinnately compound, with 3-5 segments, to 12 cm long. Heads few-flowered, solitary and terminal on slender peduncles, in much-branched cymes. Ligules of ligulate flowers yellow, purple red on outside. Achenes light brown, subcylindrical, ca. 10-ribbed, with white, barbellate pappus ca. 6 mm long.

LL. Edge of montane forest. Uncommon. Flowers in the wet season.

Lactuca inermis Forssk.

Erect perennial herb up to 1.5 m high, with thick, deep-seated taproot; stem with milky juice, often much branched from the woody base. Cauline leaves simple, oblanceolate, to 12 cm long, with grossly toothed margins, sagittate-auriculate. Heads few-flowered, in lax panicles. Ligules of ligulate flowers bright blue to almost white. Achenes reddish-brown or black, oblong-elliptic, strongly compressed, 3-4-ribbed, with yellowish beak and with yellowish barbellate pappus ca. 5 mm long.

LL. Edge of montane forest patches or degraded woodland; often in disturbed sites. Rare. Flowering season unknown.

Launaea rueppelii (Sch.Bip. ex Oliv. & Hiern) Boulos

Acaulescent perennial herb with thick wood taproot; milky juice present. Leaves in basal rosette, simple, linear-elliptic to oblanceolate, to ca. 5 cm long, margins denticulate. Heads sessile, ca. 10-flowered, several in cushion-shaped inflorescence. Involucre (narrowly) cylindrical. Ligules of ligulate flowers ca. 10 mm long, blue. Achenes brown to black, ribbed, with yellowish, barbellate deciduous pappus ca. 10 mm long.

UL. Afroalpine grassland, above 3,600 m. Uncommon. Flowers in the dry season.

Note. The plants described and depicted here may represent a high altitude form of *Launaea rueppelii*, or even a different species. There are several discrepancies to the description of the species in FEE (scapose acaulescent herb with yellow flowers; only recorded for altitudes of up to 3,000 m!).

Fig. D55. – A-C, Dianthoseris schimperi, *A, flowering, B, fruiting (from higher altitude than A), C, dug out plant showing taproot. – D-E,* Launaea rueppelii, *D, flowering, E, dug out plants showing taproot.*

Sonchus bipontini Asch.

Perennial herb; stems woody at base, often tinged red, to 2 m long, branches straggling through surrounding vegetation. Leaves simple, linear to narrowly elliptic, to 15 cm long, margins minutely denticulate with recurved teeth. Heads many, in densely aggregated cymes. Involucre cylindrical, densely white tomentose or woolly. Ligules of ligulate flowers yellow. Achenes yellowish-brown, narrowly elliptic, transversely rugulose, with white caducous pappus ca. 5 mm long.

LL. Edge of degraded montane forest, dry evergreen bushland and scrub. Uncommon. Flowers in the wet season.

Sonchus melanolepis Fresen.
Densely branched perennial herb usually hanging from rock crevices, with stems and branches to 40 cm long. Leaves sessile and with auriculate base, simple, linear to pinnatifid, glaucous, to 8 cm long. Heads solitary or rarely 2-3 at the tip of branches. Involucre oblong-campanulate, densely brown-tomentose at base. Ligules of ligulate flowers pale yellow. Achenes brown to black, oblong, transversely rugulose, with white pappus ca. 6-7 mm long.

UL. Apparently confined to vertical cliffs and to outcrops of volcanic rock and always growing in rock crevices. Rare. Flowers in the wet season.

Note. Either endemic to Ethiopia or possibly also occurring in Yemen.

Tribe Vernonieae: Vernonia
Shrubs or small trees, sometimes herbs; without milky juice. Leaves simple, alternate, entire, serrate or dentate. Inflorescences simple or paniculate cymes or corymbs. Heads 1- to many-flowered, homogamous; receptacle mostly naked. Involucre of numerous, few- to many-seriate involucral bracts with a terminal appendage. Flowers bisexual, tubular to campanulate, purple, violet, pink or white. Pappus absent or present; when present white and 1- to several-seriate and persistent or caducous.

1 Erect perennial herb with solitary heads terminal on branches ..... *Vernonia purpurea*
Shrub or small tree; heads many in dense terminal panicles 2

2 Individual heads 10-20-flowered; leaves with a greyish-green appearance ..... *Vernonia amygdalina*
Individual heads 4-6-flowered; leaves (dark) green above ..... *Vernonia rueppellii*

Vernonia amygdalina Del.
Shrub or small tree to ca. 5 m tall, usually branched from near the base; trunk with rough, longitudinally fissured bark; branches densely lenticellate, glabrous to hairy. Leaves often greyish-green in appearance, petiolate, elliptic or ovate-lanceolate, to > 20 cm long, margins entire to serrate; with a characteristic bitter taste. Heads 10-20-flowered, in dense, much-branched globose to pyramidal terminal panicles. Flowers white to pale pinkish-purplish. Achenes light brown, ca. 10-ribbed, oblong, with white to light brownish-yellow, barbellate pappus ca. 5 mm long.

LL. In open spots or at the edge of montane forest; disturbed bushland and scrub; also often in home gardens in Simen Lowland villages. Common. Flowers in the wet season.

Vernonia rueppellii Sch.Bip. ex Walp.
Shrub or small tree with a rounded crown, up to ca. 5 m tall; branches subterete, (purplish-) brown. Leaves petiolate, narrowly elliptic, to 15 cm long, glabrous, dark green above, paler below, with serrate to doubly-serrate margins. Heads ca. 5-flowered, in dense terminal corymbose panicles. Flowers pale purple to white; corolla funnel-shaped. Achenes grey to dark brown, ca. 10-ribbed, oblong, with white to yellowish-white, barbellate pappus ca. 10 mm long.

ESC, **UL**. Edge of montane forest, of evergreen scrub or woodland. Common. Flowers in the wet season.

Note. Endemic to Ethiopia.

Vernonia purpurea Sch.Bip. ex Walp.
Erect perennial herb, ± woody at the base or subshrub; stems rigid, unbranched or branched above, terete, glabrescent to slightly hairy, leafy at the apex. Leaves subsessile to shortly petiolate, elliptic to oblong-elliptic, to ca. 10 cm long, with serrulate margin and acute-apiculate apex. Heads several-flowered, solitary and terminal on branches and surrounded at the base by leaf-like bracts. Flowers red-violet to bluish-purple; corolla narrowly campanulate. Achenes grey-brown, ca. 10-ribbed, oblong, with light-brownish, barbellate pappus ca. 5 mm long.

LL. Deciduous woodland, grassland or open bushland. Rare. Flowers in the wet season.

Fig. D56. – A-C, Vernonia *spp.; A-B,* V. rueppelii, *A, habit, B, fruiting; C-E,* V. purpurea, *C, shoot with terminal head, D, head from above.*

Tribe Arctoteae: Haplocarpha

Annual herbs or, in the Simen, scapose perennial herbs with woody rootstock. Leaves alternate or, in the Simen, in dense basal rosettes, simple or pinnatifid. Heads heterogamous and radiate, large and showy, with female ray florets and bisexual, yellow disk florets; receptacle naked. Involucre of many-seriate involucral bracts, free or fused at base, margins and tips scarious or spinescent. Achenes glabrous (in the Simen) and ribbed. Pappus 2- to several-seriate, made up of small scales or absent (in the Simen).

Haplocarpha rueppellii (Sch.Bip.) Beauv.
Acaulescent perennial herb with woody rootstock and many elongated fibrous roots arising from it. Leaves in basal rosettes, petiolate, simple (rarely lobed near the base), broadly elliptic, to ca. 15 cm long (but usually smaller), shiny green and ± glabrous above, densely white-tomentose below. Heads showy, solitary and sessile in the centre of the leaf rosette (seldom on elongated scapes). Ray flowers ca. 12-20, yellow (purple-tinged below), 10 mm or more long; disc flowers tubular-campanulate, yellow. Achenes obovate, glabrous, inconspicuously ribbed, < 5 mm long; pappus absent or consisting of small scales

UL. Mostly in moist to wet and water-logged areas in grassland or *Erica* bushland. Common. Flowers in the dry and wet season.

Haplocarpha schimperi (Sch.Bip.) Beauv.
Similar to the above but easily distinguished by its oblanceolate, pinnatifid to pinnatisect leaves with ± rounded lobes.

UL. Grassland, often in wet and seepage areas. Less common than the above. Flowers in the wet and dry season.

Subfamily Asteroideae

Tribe Gnaphalieae: Phagnalon, Helichrysum, Pseudognaphalium, Chiliocephalum, and Gnaphalium

Shrubs, perennial or annual herbs. Leaves alternate, simple and with entire margins, often densely hairy. Heads heterogamous (and radiate; not in the Simen) or homogamous and disciform or discoid. Involucral bracts sometimes brightly colored. Female flowers filiform and tubular or ligulate; bisexual flowers tubular(-campanulate), sometimes functionally male. Achenes with barbellate or scale-like pappus (or pappus absent).

1 Heads in flat terminal corymbose cymes, all held together by densely matted, woolly indumentum (heads thus not clearly discernible) ..... *Chiliocephalum schimperi*
Head arrangement not as above; heads clearly discernible and with long to short peduncles 2

2 Spinescent shrubs or dwarf shrubs 3
Plants without spines 4

3 Leaves with dense greyish-white indumentum on both surfaces; involucral bracts white, spreading (giving the impression of being ligulate flowers) ..... *Helichrysum citrispinum*
Leaves not as above, light green above; involucral bracts pale yellow, erect ..... *Helichrysum horridum*

4 Perennial herbs or shrubs with stems and branches to > 2 m long, scrambling or straggling through the surrounding vegetation; heads few-flowered, numerous in dense paniculate cymes, held together by dense whitish indumentum ..... *Helichrysum schimperi*
Plants not with the above combination of characters 5

5 Shrub or bushy perennial with densely greyish-white tomentose linear to lanceolate leaves and many heads in dense globose or corymbose terminal clusters; both involucral bracts and flowers (sulphur) yellow ..... *Helichrysum splendidum*
Plants not with the above combination of characters 6

6 Heads homogamous, each with several hundred bisexual flowers; involucral bracts white, pink or red ..... *Helichrysum formosissimum*
Plants not with the above combination of characters; heads with < 100 flowers 7

7 Odorous erect perennial herb or subshrub; stems woody below, profusely branched near base; involucral bracts straw-yellow, often dark-brown at tip ..... *Helichrysum forsskahlii*
Plants not with the above combination of characters 8

8 Erect perennial herb with a rosette of long-petiolate, often broadly elliptical, 3(-5)-nerved leaves; heads many in terminal subglobose clusters ..... *Helichrysum globosum*
Plants not with the above combination of characters 9

9 Heads shortly pedunculate, solitary in leaf axils, arranged in leafy racemes .. *Phagnalon phagnaloides*
Head arrangement not as above 10

Fig. D57. – A-C, Haplocarpha *spp.; A-B,* H. rueppelii, *A, habit, B, detail; C,* H. schimperi, *habit.*

10 Leaves glabrous to arachnoid above and white woolly below, margins denticulate ..... *Phagnalon abyssinicum*
Leaves (adpressed-)tomentose on both sides, margins entire to undulate 11

11 Annual or short-lived perennial herb, only to 10 cm tall, leaves with entire to undulate margins; flowers greenish-yellow ..... *Pseudognaphalium melanosphaerum*
Stoloniferous perennial herbs, usually taller, leaves with entire margins; flowers whitish to pale lilac, red-tipped or yellow (never all greenish-white) 12

12 Leaves spreading, often obtuse or subacute-spathulate, broader near apex ..... *Gnaphalium rubriflorum*
Leaves often ascending, mostly linear or linear-lanceolate ..... *Gnaphalium tweediae*

Phagnalon phagnaloides (Hochst. ex A.Rich.) Cufod.
Perennial herb or subshrub up to 30 cm tall, with ascending to suberect stems. Leaves lanceolate to elliptic, to 25 mm long, smooth to arachnoid, margins denticulate, narrowed below into a short, winged stalk. Heads shortly pedunculate, solitary in leaf axils, arranged in

leafy racemes, each < 1 cm in diam.; outer flowers female, inner one bisexual. Achenes brown, sparsely hairy, small (ca. 1 mm long); pappus ca. 5 mm long.
UL. Dry mountain slopes. Very rare. Flowering season unknown.
Note. Endemic to the Simen. Collected 1851 by Schimper; not recollected since.

Phagnalon abyssinicum Sch.Bip. ex A.Rich
Perennial herb up to 50 cm tall; stem woody, with straggling to suberect branches, white woolly. Leaves glabrous to arachnoid above and white woolly below, margins denticulate, sessile to subamplexicaul. Heads on long, woolly peduncles, terminal and solitary or in corymbose or cymose arrangement, each ca. 1 cm in diam. Flowers as above. Achenes brown, round, sparsely hairy, small (ca. 1 mm long); pappus white, to ca. 10 mm long.
UL. Dry mountain slopes with shrubs and herbs. Rare. Flowering season unknown.
Note. Endemic to Ethiopia.

Helichrysum citrispinum Del. var. **citrispinum**
Spiny, cushion-forming perennial herb or shrub, to ca. 75 cm high and 1 m in diam; stems much-branched, with short lateral spines. Leaves often crowded near apex of branches, sessile, linear-lanceolate to oblong, to 1 cm long, with dense greyish-white indumentum on both surfaces; spines in upper leaf axils to 1.5 cm long. Heads solitary at the end of short leafy branches. Involucral bracts multiseriate, white, spreading. Flowers all bisexual, > 100 per head, yellow, corolla tubular. Achenes light brown to black, papillose, with white barbellate pappus < 5 mm long.
ESC, **UL**. Rocky areas in Afroalpine grassland; steep and inaccessible cliffs. Common. Flowers in the wet and dry season.
Note. Var. *hoehnelii* (Bale Mountains and tropical East Africa) is distinguished having less spiny or spineless stems and smaller, erect, overlapping leaves.

Helichrysum horridum (Sch.Bip.) A.Rich.
Spiny, densely and intricately branched shrub up to 1.5 m high; spines to 2.5 cm long, straw-yellow when young, straight, axillary or terminal. Leaves crowded on young shoots, sessile, linear, < 1 cm long, light green above, tomentose below. Heads solitary or in cymose clusters, terminal or axillary. Involucral bracts 5-6-seriate, pale yellow, erect. Flowers all bisexual, up to ca. 50 per head, (golden) yellow), corolla tubular. Achenes glabrous to sparsely setulose, with white barbellate pappus ca. 3 mm long.
UL. Exposed, sunny places in Afroalpine grassland. Common. Flowers in the dry season.
Note. Endemic to Ethiopia; only known from 2 Floristic Regions (Gondar, Shewa Upland).

Helichrysum formosissimum Sch.Bip ex A.Rich. var. **formosissimum**
Erect perennial herb, up to 1.5 m tall; stem leafy, usually solitary, from thickened rootstock. Leaves sessile, ovate- to lanceolate-oblong, to > 10 cm long, mostly scabrous with numerous stiff and glandular hairs. Heads hemispherical, in terminal long-pedunculate corbyms. Involucral bracts multiseriate, shiny white, pink or red. Flowers all bisexual, > 500 per head, yellow, corolla tubular-campanulate. Achenes grey, papillose, with white barbellate pappus ca. 3 mm long.
UL. Mostly in moist to wet places along streams. Rare. Flowers in the wet season.
Note. Var. *guilelmii* (S Ethiopian mountains and further southwards) has hairier leaves.

Helichrysum splendidum (Thunb.) Less.
Shrub or bushy perennial herb with woody base, up to 75 cm high; stem branched and leafy above. Leaves sessile, linear to lanceolate, to 2 cm long, densely greyish-white tomentose on both surfaces. Heads subsessile, many in dense globose or corymbose terminal clusters. Involucral bracts 4-5-seriate, sulphur yellow above. Flowers both female and bisexual, ca. 40-50 per head, yellow, tubular-campanulate. Achenes light grey, papillose or glandular, with white barbellate pappus ca. 3 mm long.

Fig. D58. – A-E, Helichrysum *spp.; A-B,* H. citrispinum, *A, habit, B, heads; C-D,* H. horridum, *C, habit, D, detail; E,* H. splendidum, *habit and inflorescences.*

UL. Afroalpine grassland; *Erica* bushland. Locally Common. Flowers in the wet season.

Helichrysum forsskahlii (J.F.Gmel.) Hilliard & B.L.Burtt var. **forskahlii**
Odorous erect perennial herb or subshrub, up to 75 cm high; stem woody below, profusely branched near base. Leaves spreading, sessile and cordate-amplexicaul, lanceolate or linear, ca.1-2 cm long, woolly especially below. Heads subsessile or shortly pedunculate, many in dense or globose corymbose cymbs. Involucral bracts 4-5-seriate, straw-yellow, often dark-brown at tip. Flowers both female and bisexual, ca. 10-30 per head, pale yellow, tubular-campanulate. Achenes grey, papillose, with white barbellate pappus ca. 2 mm long.

UL. *Erica* bushland – grassland mosaic. Uncommon. Flowers in the dry season.

Note. Var. *compactum* (Ethiopian and tropical East African mountains) has smaller, erect-patent and overlapping leaves.

Helichrysum globosum A.Rich.
Erect perennial herb, up to 75 cm tall, with thick rootstock; stem simple, basally with a rosette of long-petiolate, often broadly elliptical, 3(-5)-nerved leaves to 15 cm long; cauline leaves smaller, narrower and with shorter petioles. Heads sessile to shortly pedunculate, many in dense, branched, subglobose terminal clusters. Involucral bracts 3-4-seriate, shiny pale or brownish-yellow, pink or purplish. Flowers both female and bisexual, < 20 per head, yellow, tubular. Achenes glabrous, with white barbellate pappus ca. 3 mm long.
UL. Afroalpine grassland. Uncommon. Flowers in wet season.

Helichrysum schimperi (Sch.Bip. ex A.Rich.) Moeser
Intricately branched perennial herb or shrub with whitish or light yellowish tomentose stems and branches up to 2.5 m long, scrambling or straggling through the surrounding vegetation. Leaves petiolate to subsessile, lanceolate, to ca. 7 cm long, dark olive-green above, white cottony below. Heads many in dense paniculate cymes held together by dense white, pinkish or brownish woolly hairs. Involucral bracts 3-4-seriate, white or pale yellow, woolly at base. Flowers both female and bisexual, only ca. 5 per head, pale yellow, filiform-tubular to cylindrical. Achenes brown, glabrous, with caducous white barbellate pappus ca. 2 mm long.
LL. Edge of dry afromontane forest or bushland. Uncommon. Flowers in dry season.

Pseudognaphalium melanosphaerum (Sch.Bip. ex A.Rich.) Hilliard (syn. *Gnaphalium m.* Sch.Bip. ex A.Rich.)
Annual or short-lived perennial herb, up to 10 cm tall; stem solitary or several, mostly prostrate or ascending, slightly woolly only in the upper parts. Leaves sessile-amplexicaul, linear to spathulate, to 2.5 cm long, tomentose on both sides, margins entire to undulate. Heads sessile to shortly pedunculate, many in dense globose (sub)terminal clusters. Involucral bracts 3-seriate, outermost bracts dark brown and woolly at base. Flowers both female and bisexual, ca. 35-45 per head, greenish-yellow, very small. Achenes light brown, densely papillose, with white barbellate pappus ca. 2 mm long.
LL. Grassland. Rare. Flowering season unknown.
Note. Endemic to Ethiopia, only recorded from 3 Floristic Regions (GD, SU and BA).

Chiliocephalum schimperi Benth.
Erect annual or short-lived perennial herb, up to 75 cm tall; stem unbranched except in the inflorescence region, woolly only in the upper parts. Leaves erect-patent to spreading, oblong-lanceolate, to 5 cm long, green and sparsely hairy above, pubescent to greyish-white tomentose below. Heads very small (< 5 mm in diam.), numerous, all held together by dense woolly indumentum and arranged in flat terminal corymbose cymes. Involucral bracts shiny pale yellowish to brownish. Flowers yellow, 5-7 per head. Achenes minute; pappus absent.
UL. Grassland. Rare. Flowering season unknown.
Note. Endemic to Ethiopia.

Gnaphalium rubriflorum Hilliard
Stoloniferous perennial herb, up to 40 cm tall, with numerous unbranched or branched prostrate to decumbent stems from the rootstock; stems thinly cottony and leafy in the upper parts. Leaves spreading, sessile and clasping the stem, spathulate, to 4 cm long, appressed-tomentose on both surfaces. Heads on woolly peduncles, in compact corymbose clusters. Involucral bracts 4-seriate, the outermost light yellow to dark brownish. Flowers both female and bisexual, the females whitish to pale lilac, the bisexual red-tipped. Achenes minute; pappus of female flowers with scabrid setae, pappus of bisexual flowers barbellate.
UL. Moist grassland, along watercourses. Locally common. Flowers in the wet season.

Gnaphalium tweediae Hilliard
Very similar to the above, but leaves often ascending and linear in shape. Flowers white, yellow or red-tipped; female flowers more numerous the bisexual in a head.

Fig. D59. – A, Helichrysum schimperi, *habit. – B,* Gnaphalium tweediae, *habit.*

UL. Moist to wet rocky places in grassland. Uncommon. Flowers in the wet season.

Note. The species status of *Gnaphalium* tweediae and *G. rubriflorum* is disputed. In Flora of Tropical East Africa, they are considered varieties of *Gnaphalium unionis*. The latter is also recorded from the Ethiopian mountains.

Tribe Astereae: Conyza

Perennial herbs or shrubs, less commonly annual herbs. Leaves alternate, simple to pinnatisect. Heads heterogamous, radiate (not in the Simen) or disciform (= lacking ray flowers). Receptacle flat or convex, naked. Ray flowers (or outer disk flowers: *Conyza* in the Simen) female; disk flowers tubular below and campanulate above, bisexual. Achenes at least slightly compressed, ribbed or costate, usually pilose. Pappus mostly consisting of barbellate bristles.

1 Dwarf perennial to 3 cm tall, stem short and concealed by leaves ..... *Conyza nana*
Plants with evident aerial stem or stems 2

2 Plants with forked spines; inflorescences often hidden between spiny branches ..... *Conyza spinosa*
Plants without spines; inflorescences emergent 3

3 Plants distinctly shrubby, up to 3 m tall ..... *Conyza vernonioides*
Perennial herbs up to 1 m tall 4

4 Heads campanulate, involucral bracts deeply purple-bordered; flowers yellow ..... *Conyza hochstetteri*
Heads hemispheric, involucral bracts uniformly green; flowers pale yellow, sometimes tinged purple ... *Conyza steudelii*

Conyza vernonioides (Sch.Bip. ex A.Rich.) Wild subsp. **vernonioides**

Shrub or bushy perennial herb, up to 6 m tall; upper branches densely greyish-brown pilose, inflorescence-bearing branches leafy. Leaves sessile or narrowed to the short, winged

petiole, linear-lanceolate to elliptic, up to 13 cm long, shortly grey-pubescent and densely sessile-glandular on both surfaces, margins denticulate-serrate. Heads on short, pilose and densely sessile-glandular peduncles, in dense terminal cymose clusters. Involucral bracts 3-4-seriate, tips of bracts often purple-tinged. Flowers yellow, outer ones ligulate and female, inner ones tubular and bisexual. Achenes light to dark brown, 5-ribbed, to ca. 2 mm long, with white barbellate pappus ca. 5 mm long.

LL. Dry evergreen montane forest, especially wet, shady places such as ravines. Uncommon. Flowers in the wet season.

Note. Simen plants belong to subsp. *vernonioides*; the subdivision of the species into 3 subspecies on the basis of head size, involucral bract shape and leaf characters is, however, not generally accepted.

Conyza spinosa Sch.Bip. ex Oliv. & Hiern

Densely and intricately branched spiny subshrub with woody rootstock; lower stem parts leafless, young branches leafy, armed with forked spines. Leaves ± sessile, linear(-elliptic), to > 2 cm long, grey-green, covered with short crisp hairs, entire. Heads few together at the tip of branches, ± sessile, often hidden between spiny branches. Involucral bracts 3-4-seriate, greyish-green, tips of bracts purple-tinged. Flowers pale yellow; outer ones female, without ligules and with filiform, irregularly lobed corolla, inner ones bisexual and campanulate-tubular. Achenes light brown, asymmetric, to ca. 1 mm long, with white barbellate pappus to ca. 3 mm long.

UL. Dry montane woodland, grassy montane forest edges, open *Erica* bushland and scrub. Common. Flowers in wet season.

Note. Endemic to Ethiopia.

Conyza nana Sch.Bip. ex Oliv. & Hiern

Dwarf perennial herb, 1-3 cm tall; stem short and concealed by leaves. Leaves crowded at the base, petiolate, oblong-elliptic, to ca. 3 cm long, slightly fleshy and glabrous, margins serrate and ciliate. Heads solitary, sessile or with short, pilose stalk. Involucral bracts 3-4-seriate, greyish with purple margins and tips. Flowers yellow; outer ones female, without ligules and with filiform corolla, inner ones bisexual and campanulate-tubular. Achenes light brown, obovate, to ca. 1 mm long, with brownish-white barbellate pappus to ca. 10 mm long.

UL. Dry mountain slopes, in disturbed, heavily grazed montane grassland. Rare. Flowers in dry season.

Note. Endemic to Ethiopia; only known from 3 Floristic Regions (GD, SU and BA).

Conyza hochstetteri Sch.Bip. ex A.Rich.

Perennial herb up to 80 cm tall with a creeping or prostrate branched rootstock; stems several, erect or ascending, grey-green to red-violet at base. Lower leaves with long, winged, clasping or cordate petiole, blades elliptic to oblanceolate, to 10 cm long; upper leaves sessile and smaller; blades sparsely to densely hirsute, margins serrate-dentate to subentire. Heads campanulate, shortly stalked, in dense globose terminal cymes. Involucral bracts 3-4-seriate, pale-green, pubescent, tips of bracts purple-tinged. Flowers yellow; outer ones female, without ligules and with filiform corolla, inner ones bisexual and campanulate. Achenes light brown, sparsely appressed pilose, obovate, to ca. 1 mm long, with white barbellate pappus < 5 mm long.

UL. *Erica* bushland. Rare. Flowering season unknown.

Conyza steudelii Sch.Bip. ex A.Rich.

Erect or sometimes scrambling short-lived perennial herb, up to 1 m tall; stems branched and leafy above, both with long, spreading and short, white hairs intermixed with sessile glands. Lower leaves with winged, auriculate and clasping petiole, blades ovate to broadly lanceolate to 9 cm long; upper leaves sessile and smaller; blades scabrid to subglabrous,

margins serrate-dentate with mucronate teeth. Heads hemispheric, in small, dense, rounded shortly pedunculate cymes. Involucral bracts 3-4-seriate, greenish, tips of bracts not purple-tinged. Flowers pale yellow, sometimes tinged purple; outer ones female, without ligules and with filiform corolla, inner ones bisexual and campanulate. Achenes whitish, obovate, ca. 1 mm long, with white barbellate pappus < 5 mm long.

LL. At the edge and amongst of shrubs in disturbed dry montane woodland. Rare. Flowers in wet season.

Tribe Anthemideae: Ursinia, Artemisia, Cotula, Anthemis

Annual or perennial herbs, shrubs or rarely soft-wooded small trees (not in the Simen). Leaves alternate, rarely opposite (*Cotula*), variously dissected, pinnatisect, pinnatifid, lobed or serrate-dentate. Heads solitary or in corymb- or panicle-like inflorescences, often pedunculate, radiate, disciform or discoid. Receptacle with or without paleae. Involucral bracts several-seriate, imbricate, with scarious margins and tip. Ray flowers sterile or fertile then female), mostly white or yellow; disk flowers bisexual or functionally male, mostly yellow. Achenes homo- or heteromorphic, variously shaped. Pappus often absent, rarely consisting of a small crown or scales.

1 Heads with large, showy ray flowers 2
Heads discoid or disciform 4

2 Ray flowers pale yellow ..... *Ursinia nana*
Ray flowers white 3

3 Plants sparsely to densely hairy; stem erect or decumbent; peduncles 2-7 cm long ..... *Anthemis tigreensis*
Plants glabrous; stem prostrate; peduncles very short ..... *Anthemis semiensis*

4 Heads arranged in dense panicles or cymes or in simple racemes ..... 5 (*Artemisia*)
Heads solitary, pedunculate 7

5 Heads arranged in simple racemes; plants strongly aromatic ..... *Artemisia schimperi*
Heads in dense (elongate) panicles or cymes; plants not strongly aromatic 6

6 Middle cauline leaves up to 3 cm long, with filiform segments ..... *Artemisia abyssinica*
Middle cauline leaves up to 6 cm long, with linear segments ..... *Artemisia afra*

7 Heads shortly pedunculate, overtopped by leaves; leaves opposite, petiole base with a long sheath ..... *Cotula cryptocephala*
Heads with longer peduncle, not overtopped by leaves; leaves alternate, petiole base with a short sheath ..... *Cotula abyssinica*

Ursinia nana DC.

Erect annual herb up to 30 cm tall; stem simple or branched, glabrous. Leaves petiolate, 1-2-pinnatisect with slightly thickish linear-filiform glabrous segments, to ca. 5 cm long. Heads heterogamous, radiate, subglobose to hemispheric, < 1 cm in diam., solitary, on long peduncles exceeding the leaves. Ray flowers pale yellow (purple on outside); disc flowers yellow. Achenes whitish yellow, curved, ribbed, with minute scaly pappus.

UL. Afroalpine grassland. Rare. Flowering season unknown.

Artemisia abyssinica Sch.Bip. ex A.Rich.

Erect annual or short-lived perennial herb, up to 60 cm tall; stem solitary or with a few ascending branches from near the base. Leaves ovate in outline, bipinnatisect with filiform segments, grey- to blue-green or almost white or silvery. Heads subglobose, < 5 mm in diam., shortly stalked, many arranged in elongate thyrsoid cymes. Involucral bracts pale greyish green. Flowers all fertile; marginal flowers female, central flowers bisexual. Achenes minute (< 1 mm long), yellowish-brown, without pappus.

UL. Edge of dry montane forest; rocky grassland. Uncommon. Flowers in the wet season.
Note. Outside Ethiopia only known from Saudi Arabia.

Artemisia schimperi Sch.Bip. ex Engl.
Strongly aromatic annual or short-lived, bushy perennial herb, up to 40 cm tall; stems usually several from the root apex. Leaves bipinnatisect with filiform segments, to 4 cm long, floccose or arachnoid pubescent. Heads campanulate, < 1 cm in diam., on short stalks arising in the leaf axils throughout the stem (i.e. arranged in simple racemes). Involucral bracts light green with dark purple margins. Flowers yellow. Achenes minute (< 1 mm long), narrowly obovate, dark brown, without pappus
UL. Afroalpine grassland. Rare. Flowers in the wet season.
Note. Endemic to Ethiopia; only known from the Simen and Bale mountains.

Artemisia afra Jacq. ex Willd.
Erect perennial herb or subshrub up to 1 m tall; stems green or dark purple. Leaves petiolate, bipinnatisect with linear segments; basal leaves to 8 cm long, middle cauline leaves smaller, 5-6 cm long; blades light to dark green and sparsely white hairy above and densely white tomentose below. Heads subglobose, < 5 mm in diam., shortly stalked, many arranged in elongate thyrsoid cymes. Involucral bracts green with brownish scarious margins. Flowers yellow. Achenes minute (< 1 mm long), narrowly obovate, dark brown or blackish, without pappus.
UL. *Erica* bushland; grassland with scattered shrubs and trees. Common. Flowers in the wet season.

Cotula abyssinica Sch.Bip. ex A.Rich.
Annual or short-lived perennial herb up to 30 cm tall; stems usually richly branched near the base, branches ascending, decumbent below. Leaves alternate, petiole shortly sheathing; blades bipinnatipartite, to ca. 3 cm long, segments linear. Head disciform, ca. 5 mm in diam., solitary, on sparsely pilose peduncle overtopping the leaves. Flowers whitish(-yellowish), sometimes purplish tinged in bud; marginal ones uniseriate, female, tubular; central flowers many, bisexual, tubular. Achenes from marginal flowers winged, those from central flowers terete to slightly angular, both only ca. 1 mm long; pappus absent.
UL. Often in moist to wet areas in grassland. Common. Flowers in wet and dry season.

Cotula cryptocephala Sch.Bip. ex A.Rich.
Similar to the above but leaves opposite, larger, and petiole base with a long sheath. Heads shortly pedunculate, overtopped by leaves. Achenes monomorphic, winged and flattened.
UL. Seepage areas and moist ground in grassland. Uncommon. Flowers in dry season.

Anthemis tigreensis J.Gay ex A.Rich
Perennial herb with typically several, usually decumbent, loosely branched stems to ca. 30 cm long. Leaves petiolate, oblong or elliptic in outline, 2-3-pinnatisect, to ca. 7 cm long, segments linear, sparsely hairy to woolly tomentose (in high altitude forms). Heads radiate, heterogamous, solitary, terminal, on pubescent peduncles 2-7 cm long. Ray flowers white, sterile, ligules to 25 mm long; disk florets yellow, bisexual, corolla tubular. Achenes light brown, curved at apex, small (ca. 1.5 mm); pappus absent.
UL. Between rocks, grassland. Common. Flowers in the wet season.

Anthemis semiensis Pic.-Serm.
Very similar to the above but glabrous, small and dwarfed (only to 5 cm high) and with prostrate stems. Heads on very short peduncles; ray flowers smaller.
UL. Afroalpine grassland (?). Very rare. Flowering season unknown.
Note. The species' status is unclear; maybe only be a high altitude variant of *A. tigreensis*.

Tribe Senecioneae: Senecio, Solanecio, Cineraria, Crassocephalum, Mikaniopsis
Herbs, subshrubs or climbers, rarely soft-wooded trees (not in the Simen). Leaves alternate, entire to variously serrate-dentate or lobed. Heads radiate and heterogamous or disciform

Fig. D60. – A, Artemisia afra, *habit. – B-C*, Cotula abyssinica, *B, habit, C, heads. – D*, Anthemis tigrensis, *habit.*

and homogamous, solitary or arranged in cymose to corymbose-paniculate inflorescences. Receptacle naked. Involucral bracts mostly uniseriate. Ray flowers mostly female, often yellow; disc flowers bisexual, yellow, orange, red, pink or purplish. Achenes monomorphic, often ribbed, glabrous or pubescent. Pappus mostly consisting of scabrid-barbellate bristles.

1 Scrambling or climbing plants; petioles basally thickened, twisted or forming loops as a climbing aid ... *Mikaniopsis clematoides*
Plants not scrambling or climbing, petioles not as above ... 2

2 Plants with a globose tuber, 5 cm or more in diam. ... *Solanecio tuberosus*
Plants without tuber ... 3

3 Heads discoid; ray flowers absent ... 4
Heads radiate; ray flowers conspicuous ... 5

4 Straggling perennial herb; leaves petiolate, entire, ovate, to 10 cm wide ... *Crassocephalum macropappum*
Erect annual herb; leaves sessile-amplexicaul, entire, narrowly elliptic to linear, < 1 cm wide ... *Senecio schimperi*

5 Annual herbs ... 6
Perennial herbs or shrubs ... 7

6 Leaves in lower parts of stems long-petiolate, orbicular to deltoid-triangular, with doubly serrate margins ..... *Cineraria sebaldii*
Lower leaves with short petiole, simple or pinnatifid, of different shape ..... *Senecio mesogrammiodes*

7 Caespitose perennial herbs; leaves crowded at the base of short stems 8
Erect perennial herbs, at least 0.5 m high, or shrubs; leaves not as above 10

8 Leaves slightly fleshy, glabrous, margins entire or very indistinctly denticulate ..... *Senecio nanus*
Leaves not fleshy, variously hairy (at least at base), margins distinctly denticulate or serrate 9

9 Leaves hispid-pubescent, oblong to oblanceolate, to 17.5 x 2.5 cm ..... *Senecio schultzii*
Leaves loosely arachnoid at base, linear(-oblong), to 11 x 0.3 cm ..... *Senecio unionis*

10 Heads often > 100 per branch or stem in dense, much-branched corymbose or rounded cymes; individual heads ca. 1 cm in diam. at anthesis ..... *Senecio confertus*
Heads much fewer per branch or stem; individual heads smaller or larger 11

11 Heads 3-4 cm in diam. at anthesis, solitary or a few cymosely arranged; leaves 1-2-pinnatifid ..... *Senecio farinaceus*
Heads smaller, arranged in more-flowered inflorescences; leaves simple 12

12 Shrub to > 3 m tall, not in semi-aquatic habitats; heads 1.5-2 cm in diam. at anthesis ..... *Senecio myriocephalus*
Semi-aquatic perennial herb to 1.5 m tall; heads < 1.5 cm in diam. at anthesis ..... *Senecio steudelii*

Senecio myriocephalus Sch.Bip. ex A.Rich.
Shrubs to 3.5 m tall; stems densely branched and leafy. Leaves sessile, simple, narrowly elliptic, to 19 cm long, dark green to slightly greyish above, white tomentose below, margins serrate. Heads 1.5-2 cm in diam. at anthesis, numerous in much-branched corymbose or hemispherical cymes held above the foliage; peduncles short and slender, mostly glabrous. Ray flowers bright yellow, ligules to ca. 1 cm long, female. Achenes light brown, cylindrical, ca. 3 mm long, with pappus ca. 5 mm long.
UL. Edge of *Hypericum* or *Erica* scrub. Uncommon. Flowers in the dry season.

Senecio steudelii Sch.Bip. ex A.Rich.
Semi-aquatic perennial herb to 1.5 m tall; stem floccose-tomentose, leafy in upper parts, unbranched except in the inflorescence region. Leaves sessile with auriculate base, simple, linear-lanceolate to oblanceolate, to ca. 20 cm long, thinly floccose to glabrescent, margins mostly denticulate. Heads campanulate, small (to ca. 0.3 x 1 cm at anthesis), in corymbose cymes; peduncles short to 10 cm long, sparsely to densely arachnoid-tomentose. Ray flowers yellow, ligules to ca. 1-1.5 cm long, female. Achenes brown, oblong, costate, ca. 3-4 mm long, with pappus around 5 mm long.
UL. Along watercourses; waterlogged areas between rocks. Locally Common. Flowers in the dry season.
Note. Endemic to Ethiopia.

Senecio confertus Sch.Bip. ex A.Rich.
Erect perennial herb up to 2 m tall; stem unbranched except in the inflorescence region, leafy throughout. Leaves narrowed into a short, winged petiole or sessile and auriculate, simple, elliptic or lanceolate, mid-stem leaves to ca. 20 cm long, mostly glabrous, margins coarsely double serrate. Heads ca. 1 cm in diam. at anthesis, very numerous, often > 100 per branch or stem in dense, much-branched corymbose or rounded cymes; peduncles short to 7 cm long, sparsely to densely white pubescent. Ray flowers yellow, ligules to ca. 1 cm long, female. Achenes brown, obovate, costate, appressed setulose, ca. 2-4 mm long, with pappus ca. 5-7 mm long.
LL. Edge of dry montane forest, sometimes along river banks in forests. Rare. Flowers in wet season.
Note. In Ethiopia restricted to the northern mountains and only known from 3 Floristic Regions (GD, GJ, SU); outside Ethiopia only known from Rwanda.

Senecio farinaceus Sch.Bip. ex A.Rich.
Erect or ascending perennial herb up to 75 cm tall; stem solitary or densely branched and bushy, white-woolly in the upper parts. Leaves petiolate or sessile (uppermost leaves), oblong or obovate in outline, to ca. 7.5 cm long, 1-2-pinnatified, segments oblong or ovate-elliptic, white-woolly, margins serrate or deeply lobed. Heads broadly campanulate, 3-4 cm in diam. at anthesis, solitary and terminal or a few cymosely arranged; peduncles 3-5 cm long, white-woolly. Ray flowers many (to ca. 20), bright yellow, ligules to ca. 2 cm long, female. Achenes purplish or brownish-black, narrowly oblong, grooved, ca. 3 mm long, with pappus ca. 5-7 mm long.

UL. Rocky outcrops in Afroalpine grassland or in *Erica* scrub. Uncommon. Flowers in the dry season.

Note. Endemic to Ethiopia and only known from 2 Floristic Regions (Gondar and Gojam).

Senecio schultzii Hochst. ex A.Rich. var. **schultzii**
Bushy, caespitose perennial herb up to 30 cm tall, with often prostrate leafy branches and short stem. Leaves ± sessile, simple, oblong to oblanceolate, to 17.5 x 2.5 cm, hispid-pubescent, margins widely to shallowly serrate. Heads hemispheric, to ca. 5 mm in diam. at anthesis, solitary or arranged in corymbose cymes; peduncles 1-6 cm long, densely pubescent. Ray flowers many (to > 30), yellow, ligules to ca. 2 cm long, female. Achenes brownish to black, oblong, costate, to ca. 4 mm long, with pappus ca. 8-9 mm long.

UL. Afroalpine grassland; *Erica* scrub. Rare. Flowers in the wet season.

Note. Endemic to Ethiopia. A second variety, var. *lanatus* (confined to the Bale mountains), is distinguished by having more densely hairy (woolly) stems and leaves.

Senecio nanus Sch.Bip. ex A.Rich.
Caespitose, rhizomatous perennial herb up to 10 cm tall with thick rootstock. Leaves basal, sessile, simple, slightly fleshy, very narrowly oblong, to ca. 8.5 cm long, margins entire or very indistinctly denticulate. Heads ca. 3 cm in diam. at anthesis, solitary, terminal; peduncles up to 10 cm long. Ray flowers many (to ca. 20), yellow (reddish-purplish on the outside), ligules to ca. 2 cm long, female. Achenes light brown, oblong, costate, to ca. 3 mm long, with pappus ca. 7-8 mm long.

UL. Depressed, waterlogged rocky areas in Afroalpine grassland. Locally common. Flowers in the wet season.

Note. Endemic to Ethiopia.

Fig. D61. – A-B. Senecio nanus. *A. habit. B. detail.*

Senecio unionis Sch.Bip. ex A.Rich.
Caespitose, much-branched perennial herb up to 25 cm tall, with often red-brown tinged ascending branches. Leaves sessile, simple, linear(-oblong), to 11 x 0.3 cm, loosely arachnoid at base, margins denticulate or serrate and revolute. Heads subhemispherical, < 1 cm in diam., solitary and terminating the branches or in loose corymbose cymes; penduncles short or to ca. 6 cm long, mostly ± glabrous. Ray flowers to ca. 10, yellow, ligules to ca. 1.5 cm long, female. Achenes purplish-brown to black, oblong-elliptic, costate, to ca. 3 mm long, with pappus to ca. 5 mm long.
UL. Rocky places, open slopes in *Erica* scrub and Afroalpine grassland. Uncommon. Flowers in the wet season.
Note. Endemic to Ethiopia.

Senecio mesogrammiodes O.Hoffm.
Erect annual herb up to 50 cm tall; stem branched throughout. Leaves shortly petiolate, simple to 2-pinnatifid, to 6 cm long, mostly glabrous and slightly fleshy, margins entire or denticulate, revolute. Heads campanulate, ca. 1 cm in diam. at anthesis, in lax corymbose cymes; penducles short. Ray flowers few (< 10), yellow, ligules < 1 cm long, female. Achenes purplish-brown to black, oblong-elliptic, densely strigose, to ca. 3 mm long, with pappus to ca. 5 mm long.
UL. Moist, wet areas in grassland and *Erica* scrub. Uncommon. Flowers in the wet season.

Senecio schimperi Sch.Bip. ex A.Rich.
Erect annual herb up to 70 cm tall; stem often branched and blue-violet tinged at base, glabrous. Leaves sessile-amplexicaul, simple, narrowly elliptic to linear, to ca. 10 cm long and < 1 cm wide, glabrous, margins mostly entire. Heads discoid (lacking ray flowers), < 1 cm in diam. at anthesis, terminal or axillary, in corymbose cymes; peduncles very short. Achenes light brown, oblong-elliptic, costate, < 3 mm long, with pappus to ca. 4 mm long.
UL. Afroalpine grassland; low open scrub. Uncommon. Flowers in the wet season.
Note. Endemic to Ethiopia.

Solanecio tuberosus (Sch.Bip. ex A.Rich.) C.Jeffrey var. **tuberosus** (syn. *Senecio tuberosus* Sch.Bip. ex A.Rich.)
Erect perennial herb, up to 60 cm tall, with irregular, flattened, globose, brown tuber up to 7 cm in diam.; often several separate stems produced from the apex of the tuber; stems deep purple and leafy at the base. Basal leaves long-petiolate, (ovate-)elliptic to spathulate, to 30 x 14 cm, fleshy, glabrous and glossy green; upper leaves shortly petiolate or sessile, narrower. Heads discoid, > 1 cm in diam. at anthesis, shortly stalked, in dense umbelliform cymes. Flowers bright yellow, tubular, 10-20 per head. Achenes light brown, oblong-elliptic, costate, ca. 4 mm long, with white, barbellate pappus ca. 5 mm long.
LL. Moist montane grassland; evergreen bushland. Rare. Flowering season unknown.
Note. Another variety, var. *pubescens*, has densely hairy leaves and bright orange flowers; it is confined to Ethiopia and only known from the Shewa Uplands.

Cineraria sebaldii Cufod.
Erect annual herb, up to 60 cm tall; stems often reddish-brown below, unbranched or branched near the base. Lower leaves long-petiolate, simple, orbicular to deltoid-triangular, to 3 x 5 cm, glabrous above, margins doubly serrate (as in *Geranium*); upper leaves (sub)sessile, pinnatilobed, smaller. Heads radiate, ca. 1 cm in diam. at anthesis, pedunculate, in corymbose cymes. Ray flowers to ca. 8, yellow, ligules < 1 cm long, female. Achenes black, oblanceolate, convex on outside, flat on inner surface to ca. 2 mm long, with white pappus < 5 mm long.
UL. Rocky Afroalpine grassland. Uncommon. Flowers in the wet season.
Note. Endemic to Ethiopia.

Crassocephalum macropappum (Sch.Bip. ex A.Rich.) S. Moore (syn. *Senecio macropappus* Sch.Bip. ex A.Rich.]

Straggling perennial herb; stems to 2 m long, slender and weak, scabrid-pubescent, often growing through surrounding vegetation. Leaves petiolate, simple, ovate, to 10 x 10 cm, pale green above, grey-green below, sparsely to densely scabrid-pubescent (especially on the veins), margins closely, irregularly and often unequally serrate. Heads discoid (lacking ray flowers), campanulate-hemispheric, ca.1 cm in diam. at anthesis, solitary or a few together on long sparsely to densely pubescent peduncles. Disc flowers bright yellow. Achenes black, ribbed, ca. 2 mm long, with white pappus ca. 1 cm long.

LL. Evergreen forest and wood- and bushland margins; disturbed places. Uncommon. Flowers in wet season.

Note. Endemic to Ethiopia.

Mikaniopsis clematoides (Sch.Bip. ex A.Rich.) Milne-Redh. (syn. *Senecio clematoides* Sch.Bip. ex A.Rich.]

Scrambling, climbing or twining perennial herb or subshrub with profusely branched stems to 5 m long. Leaves with basally thickened, twisted or loop-forming petioles (serving as climbing aid), blades ovate with cordate base, to 10 x 8 cm, grey-green above, paler below, mostly glabrous or glabrescent. Heads discoid (lacking ray flowers), narrowly campanulate, ca. 0.5 cm in diam. at anthesis, in axillary and terminal rounded dense corymbs; peduncles short to long, sparsely to densely cottony-pubescent. Disc flowers pale yellow to whitish, ca. 10-15 per head. Achenes brown, glabrous, columnar, ca. 2 mm long, with white barbellate pappus ca. 5 mm long.

LL. Edge of wet or dry montane forest (remnants) or in evergreen scrub. Uncommon. Flowering season unknown.

Note. Endemic to Ethiopia.

Tribe Heliantheae: Guizotia, Bidens

Annual or perennial herbs or shrubs. Leaves alternate (not in the Simen), opposite or (rarely) whorled, simple or compound. Heads heterogamous and radiate (in the Simen); receptacle with paleae (in the Simen) or not. Involucral bract 2- to several-seriate, free or united at base. Ray flowers yellow (-orange) (in the Simen). Achenes angular or compressed, often dark brown to black. Pappus bristle-like, aristate, coroniform or absent.

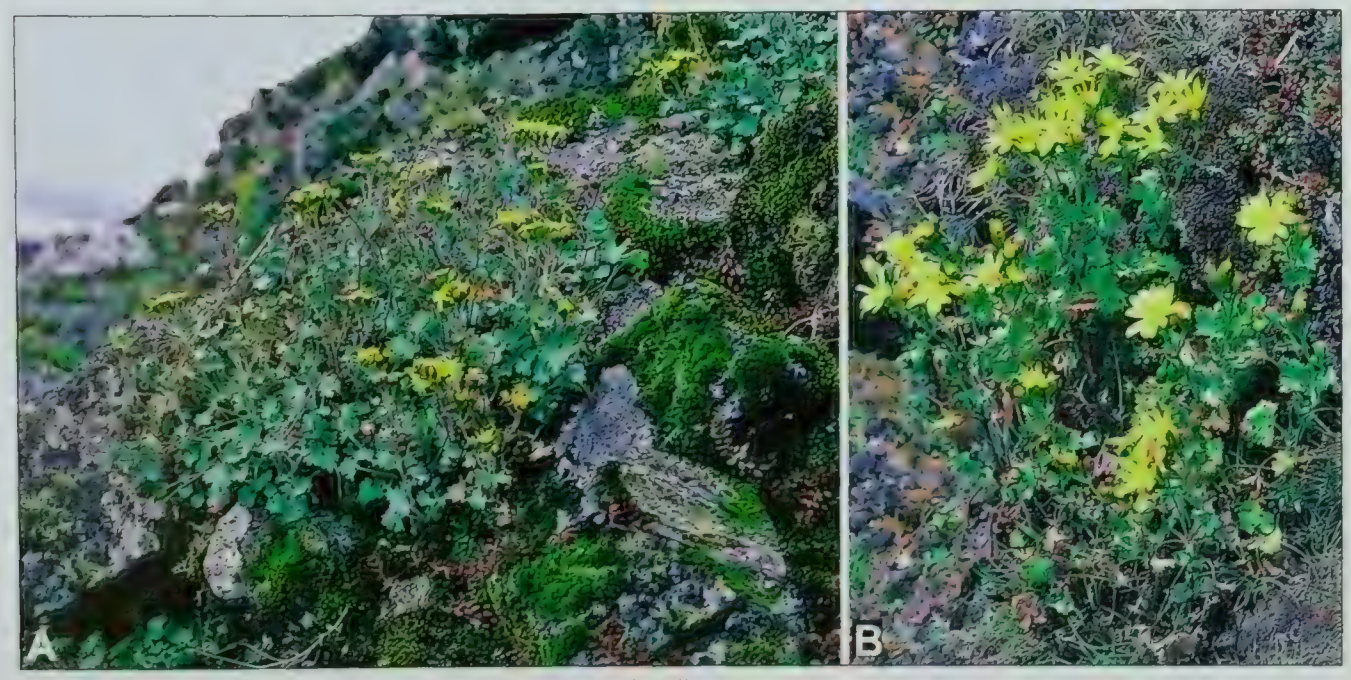

Fig. D62. – A-B, Cineraria sebaldii, *A, habit, B, detail.*

1 Leaves all simple, margins serrate to serrulate ..... *Guizotia villosa*
Leaves pinnatisect or pinnatifid (although some leaves sometimes simple) ..... 2 (*Bidens*)

2 Annual herbs 3
Perennial herbs or subshrubs 4

3 Ray flowers uniformly yellow ..... *Bidens carinata*
Ray flowers yellow, mostly with orange blotches in the middle and at base ..... *Bidens pachyloma*

4 Leaves simple or pinnately 3-lobed, with the terminal lobe being longest and widest; leaves sometimes in whorls of 3 ..... *Bidens ternata*
Leaves more dissected, pinnatipartite or pinnatisect; leaves not in whorls of 3 5

5 Leaves 1-2-pinnatisect, leaf segments linear ..... *Bidens macroptera*
Leaves pinnatipartite, primary leaf segments ovate to lanceolate ..... *Bidens rueppellii*

Guizotia villosa Sch.Bip.
Much-branched annual herb up to 65 cm tall; stem pale purple, densely hairy except at base. Leaves opposite, sessile, simple, lanceolate to narrowly elliptic, to 12 x 5 cm, densely pilose, margins serrate to serrulate, recurved. Heads to ca. 5 cm in diam., numerous in paniculate cymes; peduncles short to long, pilose. Ray flowers yellow, 5, fertile, rays to ca. 5 mm long; disc flowers few, yellow. Achenes black, around 1.5 mm long; pappus absent.
LL. Wood- and grassland. Locally common. Flowers in the dry season.
Note. Endemic to Ethiopia.

Bidens carinata Cufod. ex Mesfin
Erect, gregarious annual herb to 1 m tall; stem usually unbranched except for inflorescence-bearing branches, glabrous or glabrescent. Leaves petiolate, rhombic in outline, to 12 cm long, olive-green above, paler below, 1-3-pinnatisect, ultimate leaf segments linear-lanceolate. Heads erect, in lax corymbose cymes, on long peduncles. Ray flowers yellow, ca. 8, neuter, rays to ca. 1.5 cm long; disk flowers many, bisexual. Achenes black, glabrous, shiny, < 5 mm long; pappus minute, crown-like.
LL. Grassland, abandoned cultivations. Locally common. Flowers in the wet season.
Note. Endemic to Ethiopia.

Bidens macroptera (Sch.Bip. ex Chiov.) Mesfin
Perennial herb, up to 60 cm tall, with several decumbent or prostrate or suberect stems from a woody rootstock. Leaves petiolate, broadly ovate to rhomboid in outline, to 7 cm long, dark olive-green above, pale below, slightly fleshy, 1-2-pinnatisect, ultimate leaf segments linear, glabrous (or veins sometimes sparsely pubescent. Heads erect at anthesis, drooping in fruit, mostly solitary and terminating branches; peduncles to 8 cm long, glabrous or sparsely pubescent. Ray flowers yellow (sometimes with orange blotches in the middle and at base), ca. 8-13, neuter, rays to ca. 3 cm long; disk flowers many, bisexual. Achenes dark brown or black, with winged margins, to ca. 10 mm long; pappus indistinct, crown-like.
UL. Rocky areas in grassland and in *Erica* scrub. Common. Flowers in the wet season.
Note. Endemic to Ethiopia.

Bidens pachyloma (Oliv. & Hiern) Cufod.
Erect annual herb, up to 75 cm tall; stem often with dense ascending branches. Leaves petiolate, ovate to ovate-lanceolate in outline, to ca. 10 cm long, 1-2-pinnatisect, leaf segments ovate or oblong-lanceolate, pubescent mainly along veins and margins, margins irregularly serrate or lobed. Heads erect, in lax paniculate cymes; peduncles long, densely pubescent above. Ray flowers yellow, mostly with orange blotches in the middle and at base, ca. 8, neuter, rays to ca. 1.5 cm long; disk flowers many, bisexual. Achenes black, with winged margins, to ca. 10 mm long; pappus indistinct.
LL. Grassland with bush clumps, wooded grassland; margin of cultivated fields. Uncommon. Flowering season unknown.
Note. Endemic to Ethiopia.

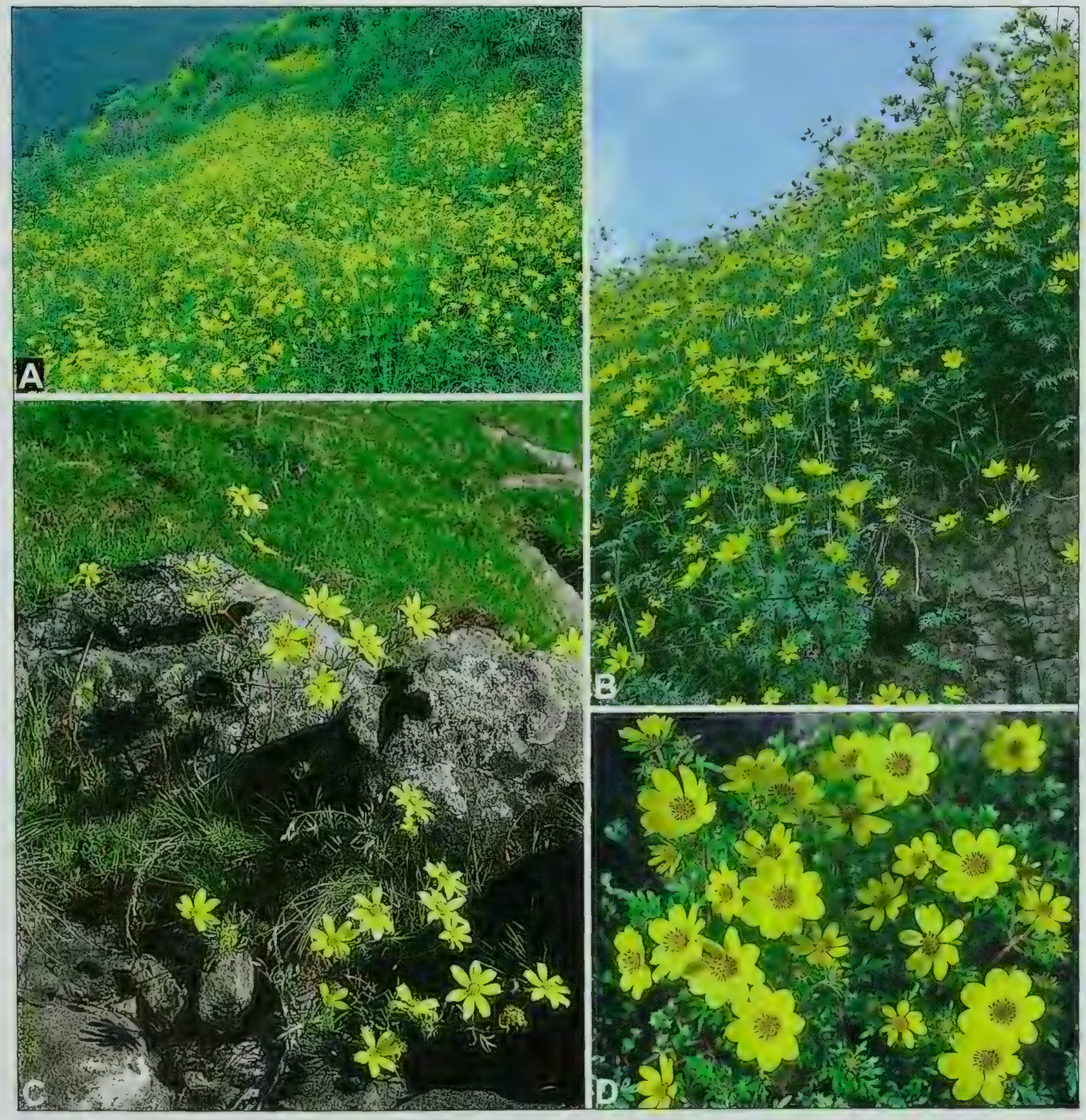

Fig. D63. – A-D, Bidens *spp.; A-B,* B. carinata, *A, habit, B, detail; C,* B. macroptera, *habit; D,* B. pachyloma *(cf.), inflorescences.*

Bidens rueppellii (Sch.Bip.) Sherff

Erect perennial herb or subshrub up to 2 m tall, usually with several stems from a thickened rootstock. Leaves petiolate, ovate in outline, to ca. 14 cm long, discolorous, pinnatipartite, primary leaf segments ovate to linear-lanceolate, both surfaces hispid, margins serrate. Heads erect, in lax corymbose cymes; peduncles to > 10 cm long, densely pubescent. Ray flowers yellow, ca. 11-13, female and fertile, rays to ca. 2.5 cm long; disk flowers many, bisexual. Achenes grey to black, glabrous, shiny, ca. 5 mm long; pappus minute, crown-like.

UL. Rocky mountain slopes; edge of scrub; river and stream banks. Uncommon. Flowering season unknown.

Note. Outside Ethiopia only known from Kenya

Bidens ternata (Chiov.) Scherff var. **ternata**
Erect perennial herb up to 1.5 m tall, mostly with several stems from a woody rootstock. Leaves opposite or ternate, sessile or shortly petiolate, simple or pinnately 3-lobed, with the terminal lobe being longest and widest, margins crenate or (coarsely) serrate, hairy. Heads erect, in lax corymbose cymes; peduncles to 8 cm long, densely pubescent. Ray flowers yellow, ca. 12-15, female and fertile, rays to ca. 3 cm long; disk flowers many, bisexual. Achenes brown to black, glabrous, shiny, ca. 5 mm long; pappus small, bristly.

LL. Grassland; forest edges. Uncommon. Flowers in the wet season.

Note. Var. *vatkei*, only known from Gondar Floristic Region, is distinguished by having longer petioles and more divided leaves.

GENTIANACEAE (146)

Annual or perennial herbs (or shrubs or, rarely, small trees; not in the Simen). Leaves simple, entire, opposite, sometimes in basal rosettes; stipules absent. Inflorescences various, often cymose or crowded into fascicles or ± globose heads, or flowers solitary. Flowers bisexual, regular (rarely irregular), mostly 4–5-merous. Calyx lobes united or ± free, persistent. Corolla sympetalous, with elongate tube; lobes twisted or overlapping in bud, often with scales or nectaries within. Stamens as many as the petals and alternating with them. Ovary superior, 2-carpellate, 1-chambered, with few to many ovules; stigma 2-lobed to capitate. Fruit a septicidal capsule, with small, often oily seeds.

1 Corolla with funnel-shaped to cylindrical tube, as long as or longer than the lobes; corolla lobes without nectaries at base ..... *Sebaea brachyphylla*
Corolla ± rotate, lobes much longer than the tube; corolla lobes with 1 or 2 nectaries at base 2

2 Annual herb ..... *Swertia abyssinica*
Perennial herbs 3

3 Base of corolla lobes with only 1 nectary 4
Base of corolla lobes with 2 nectaries 5

4 Corolla lobes obtuse; erect perennial herb with stems to 1.5 m tall ..... *Swertia kilimandscharica*
Corolla lobes acute; plants to 0.4 m tall, mostly much-branched from the base ..... *Swertia schimperi*

4 Stem leaves lanceolate or elliptic-spathulate, obtuse, never truncate; corolla lobes lanceolate or elliptic, obtuse 5
Stem leaves orbicular or spathulate, truncate; corolla lobes obovate or elliptic, usually truncate 6

5 Stem leaves elliptic-spathulate or distinctly narrowed at the base, never amplexicaul .... *Swertia scottii*
Stem leaves lanceolate, amplexicaul or broadly sessile at the base ..... *Swertia engleri*

6 Plants cushion-forming; stems much branched from their bases; nectaries circular ... *Swertia lugardae*
Plant not forming cushions; stems solitary, unbranched except in the inflorescence; nectaries oblong or elliptic ..... *Swertia pumila*

Sebaea brachyphylla Griseb.
Annual herb to ca. 0.5 m tall; stems mostly unbranched. Leaves sessile, ovate-orbicular to subreniform, as wide as long or wider, to ca. 10 x 13 mm, base amplexicaul, cordate. Flowers small, yellow, in terminal, few- to many-flowered dichotomous cymes; corolla tube funnel-shaped or cylindrical, as long as or longer than the lobes. Capsule small, ellipsoid, many-seeded.

UL. Moist and boggy areas in grassland; along watercourses. Uncommon. Flowers in the wet season.

Swertia engleri Gilg var. **engleri**
Perennial herb with basal leaf rosette; stems to 40 cm long, much branched from the base, branches creeping at base and ascending to erect in the inflorescence region. Basal rosette leaves long-petiolate, elliptic-lanceolate or lanceolate-spathulate, to 9 cm long, cauline leaves subsessile or amplexicaul, lancolate, smaller. Flowers few in reduced panicles;

corolla lobes white inside and white with dorsal median brown or purplish stripes on the outside; base of lobes with 2 oblong nectaries, beset with few (usually 4) fimbriae below. Capsule oblong, many-seeded.

UL. Open, moist grassland, often in Giant Lobelia (*Lobelia rhynchopetalum*) stands. Uncommon. Flowers in the wet season.

Note. Var. *engleri* is endemic to Ethiopia and only known from 2 Floristic Regions (GD, WU). Var. *woodii* (nectaries with more and longer fimbriae on the margins), is restricted to Yemen.

Swertia abyssinica Hochst.

Erect annual herb with basal leaf rosette; stems 8–65 cm long, unbranched except in the inflorescence. Basal rosette leaves falling soon, petiolate, oblanceolate, elliptic or spathulate, to 3.5 cm long; cauline leaves sessile, amplexicaul, ovate to orbicular, smaller. Flowers in lax terminal panicles; corolla lobes white inside and creamy yellow outside, or white with brown dorsal median stripes on the outside; base of lobes with 2 elliptic or ovoid, yellow fimbriate nectaries. Capsule oblong or ellipsoid, many-seeded.

LL, (UL). Montane forest edges; *Erica* bushland; grassland. Common. Flowers in the wet season.

Swertia lugardae Bullock

Cushion-forming perennial herb with basal leaf rosette; stems 2 to > 10cm long, usually much branched from the base. Basal rosette leaves petiolate, spathulate or elliptic-obovate, to ca. 2 cm long; cauline leaves subsessile, obovate-lanceolate or subspathulate, smaller. Flowers in corymb-like inflorescences with many several-flowered partial inflorescences. Corolla lobes white inside and white with brown or purplish dorsal median stripes on the outside; base of lobes with 2 circular, yellow and greenish-spotted, fimbriate nectaries. Capsule elliptic or oblong-elliptic, many-seeded.

UL. Afroalpine grassland; *Erica* bushland. Common. Flowers in the wet season.

Fig. D64. – A-E, Swertia *spp.; A*, S. engleri, *habit (photo* Sileshi Nemomissa*); B-C*, S. abyssinica, *B, habit, C, flowers; D-E*, S. lugardae, *D, habit, E, detail.*

Swertia pumila Hochst.
Perennial herb with basal leaf rosette; stems 7–16 cm long, unbranched except in the inflorescence region. Basal rosette leaves petiolate, elliptic or obovate, to ca. 2.5 cm long; cauline leaves subsessile, amplexicaul, broadly elliptic, smaller. Flowers several in reduced terminal panicles; corolla lobes white inside and white with brown to purplish dorsal median stripes on the outside; base of lobes with 2 oblong or elliptic, yellow-greenish, fimbriate nectaries. Capsule ovate, many-seeded.

UL. Afroalpine grassland; *Erica* bushland. Rare. Flowers in the wet season.

Note. Endemic to Ethiopia.

Swertia scottii J.Shah
Perennial herb with basal leaf rosette; stems to 20 cm long, branched from the base. Cauline leaves subsessile, lanceolate(-elliptic) or lanceolate-spathulate, to ca. 2.5 cm long, obtuse at the apex. Flowers few in reduced terminal panicles; corolla lobes white inside and white with brown to purplish dorsal median stripes on the outside; base of lobes with 2 elliptic or ovoid fimbriate nectaries. Capsules unknown.

UL. In damp overhanging rocks. Very rare. Flowering season unknown.

Note. Endemic to the Simen. Known only from the type specimen and never collected again. The species is possibly extinct.

Swertia schimperi (Hochst.) Griseb. [syn. *S. fimbriata* (Hochst.) Cufod.]
Perennial herb with basal leaf rosette; stems ca. 15–40 cm long, mostly much branched from the base. Basal rosette leaves usually sessile, oblong-lanceolate or elliptic-lanceolate, to ca. 3.5 cm long; cauline leaves subsessile, amplexicaul, broadly ovate or lanceolate, larger (to 7 cm long). Flowers in ± elongated, panicle-like inflorescences with many several-flowered partial inflorescences. Corolla lobes ovate-(lanceolate) or elliptic, acute, light purplish in- and outside, inside with blue veins; base of lobes with 1 elliptic, ovate or cordate, yellowish-green or green, fimbriate nectary. Capsule ovate, many-seeded.

UL. Grassland and *Erica* bushland; often in seasonally waterlogged and boggy sites dominated with sedges. Locally common. Flowers in the wet season.

Swertia kilimandscharica Engl.
Perennial herb with basal leaf rosette; stems to 1.5 m long, unbranched or much branched. Basal rosette leaves usually falling soon, petiolate, obovate-spathulate, to 9 cm long; cauline leaves subsessile, amplexicaul, (oblong-)lanceolate, cordate or ovate throughout, larger (to 15 cm long). Flowers many in elongated, ± cylindrical inflorescences consisting of numerous several-flowered partial inflorescences. Corolla lobes elliptic to oblong-elliptic or obovate, obtuse, pinkish-white, pale blue to deep violet on inside and outside, inside often with blue veins; base of lobes with 1 circular, elliptic to ovate, green, fimbriate nectary. Capsule ovate-elliptic, many-seeded.

LL, **UL**. Wet, shady areas of rocky outcrops; moist or swampy places in grassland. Rare. Flowers in the wet season.

PRIMULACEAE (147)

Annual or perennial herbs. Leaves alternate, opposite or whorled, sometimes the basal ones in rosettes, simple, with entire to dentate or ± deeply lobed; stipules absent. Inflorescences various, spikes, racemes, or corymb-, panicle- or umbel-like, sometimes reduced to solitary flowers. Flowers bisexual, regular, sometimes heterostylous, mostly 5-6-merous (in the Simen). Calyx lobes fused. Corolla sympetalous, salver-shaped, rotate to subcampanulate. Stamens usually inserted on the corolla, as many as the corolla lobes, opposite to them and alternate with the sepals. Ovary superior (in the Simen), 1-chambered, with central, multi-ovulate placenta; style simple, stigma entire. Fruit capsular, either valvate or, less

Fig. D65. – A-E, Swertia *spp.; A,* S. pumila, *habit, flowers (photo* Sileshi Nemomissa*); B-C,* S. schimperi, *B, habit, C, flowers; D,* S. kilimandscharica, *habit, flowers and fruits.*

commonly, circumscissile (opening by means of an apical lid *Anagallis* in the Simen). Seeds small, many, usually angular, sometimes ± winged.

1 Flowers large, with salver-shaped, golden yellow corollas, in inflorescences borne on long stalks .... *Primula verticillata* subsp. *simensis*
Flowers small, with rotate or campanulate blue, red or pale pink corollas, solitary in leaf axils 2

2 Corolla rotate, blue or red; corolla lobes ± as long as the calyx lobes ..... *Anagallis arvenis*
Corolla campanulate, pale pink; corolla lobes 2-3 times longer than calyx lobes ..... *Anagallis serpens*

Anagallis arvensis L. subsp. **arvensis**
Annual or biennial herbs with decumbent or rarely suberect 4-angular stems up to ca. 30 cm long. Leaves opposite, sessile, ovate to lanceolate, to 2 cm long. Flowers pedicellate, solitary in the axils to the upper leaves; corolla rotate, ca. 1 cm in diam., red or, more commonly, blue, ± as long as the calyx. Capsule globose, circumscissile, many-seeded.

LL. Mostly in disturbed areas; abandoned fields, fallow land. Common. Flowers in the wet season.

Note. An introduced weed, originally from Europe but now cosmopolitan.

Anagallis serpens Hochst. ex DC. subsp. **serpens**
Perennial herbs; stems prostrate, rooting at the nodes, slightly branched, up to 40 cm long. Leaves opposite, petiolate, mostly obovate to broadly ovate or orbicular, up to 1.5 cm long. Flowers pedicellate, solitary, axillary; corolla campanulate, > 1 cm in diam., pale pink, with oblong to obovate lobes, 2-3 times longer than calyx lobes. Capsule globose, circumscissile, many-seeded.

UL. Mostly in moist to wet places such as along small watercourses. Uncommon. Flowers in the wet season.

Note. Subsp. *meyeri-johannis*, differing primarily in having alternate and mostly narrower leaves, is restricted to the mountains of Tropical East Africa.

Primula verticillata Forssk. subsp. **simensis** (Hochst.) W.W.Sm. & Forest
Perennial herbs with stout rhizome; all parts farinose (with white, mealy or powdery covering) or not. Leaves in basal rosette, winged petiolate, lanceolate to oblanceolate, to 25 cm long, with irregularly serrate or biserrate margins. Inflorescences on stalk to ca. 0.5 m long, consisting of 1 to several bracteose (pseudo-)whorls of several to many flowers. Corolla golden-yellow, salver-shaped, tube 3-4 cm long, lobes obovate, ca. 1.5-2 cm long. Capsule included in persistent campanulate calyx, many-seeded.

ESC, **UL**. Mostly in vertical cliff faces in cracks of rocks; usually shady, damp, protected areas. Rare. Flowers in the wet and dry season.

Note. Subsp. *simensis* is endemic to Ethiopia while subsp. *verticillata* is restricted to the mountains of SW Arabia and Somalia.

PLANTAGINACEAE (149)

Annual or perennial herbs (in the Simen) or sometimes shrubs. Leaves in basal rosettes or not, opposite or alternate, simple or lobed, often with parallel veins: stipules absent. Flowers in spikes, regular, small and inconspicuous, mostly 4-merous. Calyx persistent, papery. Corolla sympetalous, membranous. Stamens with long, sometimes colored filaments, attached to and exserted from the corolla tube, and large, conspicuous anthers. Ovary superior, 1–4 chambered, with 1 to many ovules per locule; style simple, with long and narrow unbranched stigma. Fruit a circumscissile capsule (in the Simen).

Plantago afra L. var. **stricta** (Schousb.) Verdc.
Erect, mostly hairy annual herb; stems mostly unbranched, to ca. 20 cm tall. Leaves opposite, linear to linear-lanceolate only to ca. 2 mm wide, margins usually entire. Spikes few to several in axils of upper leaves, ovate-globose in outline. Flowers minute, with conspicuous creamy-white to yellowish exserted anthers. Capsule ovoidal, minute, 2-seeded.

UL. Rocky places in grassland; also in disturbed places and abandoned fields. Common. Flowers in the wet season.

Note. Var. *afra*, with broader leaves, occurs from the Mediterranean to India.

Plantago lanceolata L.
Perennial herb with basal leaf rosette. Leaves narrowly elliptic or narrowly oblanceolate, to > 10 cm long, with conspicuous parallel main veins. Flowers in dense, ± cylindrical, elongated

Fig. D66. – A-E. Primula verticillata *subsp.* simensis*: A. habitat and habit. B. farinose and non-farinose individual. C. farinose, flowering. D-E. non-farinose, inflorescences and flowers. – F-H,* Plantago *spp.; F-G.* P. afra *var.* stricta*. F. habit and inflorescences. G. detail; H.* P. lanceolata*, inflorescence.*

spikes borne on long stalks: filaments filiform, long, white tinged yellowish to pinkish-lilac; anthers creamy-white to whitish. Capsule narrowly ovoidal, minute, 2-seeded.

UL. Heavily grazed grassland; abandoned fields; waste ground. Common. Flowers in the wet and dry season.

Note. An introduced weed native in Europe and Asia but now cosmopolitan.

LOBELIACEAE (151)

Herbs, subshrubs or shrubs; milky latex often present. Leaves alternate, more rarely opposite or whorled; stipules absent. Inflorescences generally racemose, or flowers solitary in leaf axils. Flowers bisexual, irregular, often 2- (or 1-)lipped and resupinate (180° inverted on their stalks), 5-merous. Sepals valvate in bud. Corolla sympetalous. Stamens as many as and alternating with petals; anthers united into a tube or rarely free. Ovary inferior, (1-)2-chambered, each locule with few to many ovules; style 1, with pollen collecting hairs at or near the apex, stigma lobes 2. Fruit a capsule usually dehiscing by 2 apical valves or ± indehiscent, often crowned with the persistent calyx lobes. Seeds few to many.

1 Tall tree-like herbs with leaves in rosettes ("Giant Lobelias") 2
Small annual or perennial herbs 3

2 Rosette leaves with doubly serrate margins; inflorescences relatively thin, flowers greenish or greenish-white ..... *Lobelia giberroa*
Rosette leaves with entire margins; inflorescences relatively thick, flowers grey-blue to purplish ..... *Lobelia rhynchopetalum*

3 Flowers dull pink, brownish purple or violet ..... *Monopsis stellarioides* subsp. *schimperiana*
Flowers blue, mauve or white with dark markings 4

4 Annual herbs; leaves glabrous, margins serrate to subentire ..... *Lobelia exilis*
Perennial herbs; leaves ciliate to pubescent, margins crenate ..... *Lobelia schimperi*

Lobelia giberroa Hemsl.

Tree-like herb to c. 10 m tall when in flower; older stems usually not more than ca. 5 cm in diam. Leaves in rosettes, blades oblanceolate to oblong-ovate, to ca. 90 cm long, margins doubly serrate. Flowers greenish or greenish-white, very many in a several m long, (narrowly) cylindrical, candle-like, dense and unbranched spike; bracts subtending individual flowers small and inconspicuous. Corolla with 3 lobes united to form a lip with linear lobes; filaments and anthers forming a long-exserted tube with hairy apex, 2-lobed stigma distinctly exserted from it in older flowers. Capsule with 2 short valves, crowned by persistent calyx Seeds narrowly winged, numerous.

LL. Montane forest edges, often along streams. Locally common. Flowers in the wet season.

Lobelia rhynchopetalum Hemsl.

Tree-like herb to c. 7 m tall when in flower; older stems 10 cm or more in diam. Leaves in rosettes, blades (ob)lanceolate, to c. 80 cm long, glossy, margins entire. Flowers grey-blue to purplish, very many in a several m long, cylindrical, candle-like, dense and unbranched spike; subtending bracts longer than (and ± obscuring) the flowers. Corolla split to the base on the back and forming a lower lip; filaments and anthers forming a tube shorter than the lip, 2-lobed stigma distinctly exserted from it in older flowers. Capsule with 2 short valves, crowned by persistent calyx Seeds narrowly winged on one side, numerous.

UL. Grassland; in *Carex monostachya* stands; rocky mountain slopes. Locally common. Flowers all year round.

Note. Endemic to Ethiopia.

Lobelia schimperi Hochst. ex A.Rich.

Perennial herb with ± prostrate stems to ca. 30 cm long. Leaves shortly petiolate, narrowly to broadly elliptic or obovate, to ca. 15 mm long, ciliate to pubescent, margins prominently crenate. Flowers solitary in leaf axils, on pedicels much longer than the subtending leaves; corolla blue, > 10 mm long. Capsule with prominent valves, ± as long as or longer than the inferior part of the capsule. Seeds compressed.

UL. Along streams; wet, rocky places. Uncommon. Flowers in the wet season.

Note. Endemic to the Simen.

Fig. D67. – A-E, Lobelia *species; A-G, Giant Lobelias, A-D,* L. giberroa, *A-B, habit vegetative and flowering, C, flowers, D, fruiting inflorescence; E-G,* L. rhynchopetalum, *E, habitat and habit (with 1 flowering individual), F, flowering plants, G, bracts and flowers; H,* L. schimperi, *habit and flowers.*

Lobelia exilis Hochst. ex A.Rich.
Annual herb up to 20 cm tall. Leaves lanceolate to elliptic or broadly ovate, to ca. 20 mm long, glabrous, margins serrate to subentire. Flowers few in upper leaf axils, on pedicels much longer than the subtending leaves; corolla blue, mauve or white with dark markings, < 10 mm long. Capsule with valves shorter than the inferior part of the capsule. Seeds prominently ridged.

UL. Moist places in grassland; in boggy areas, along streams. Common. Flowers in wet the season.

Note. Endemic to Ethiopia.

Monopsis stellarioides (Persl.) Urb. subsp. **schimperiana** (Urb.) Thulin
Annual or perennial herb with decumbent stems to ca. 0.5 m long. Leaves opposite, linear to elliptic, to ca. 3 cm long, hairy, margins crenate to serrate. Flowers solitary in leaf axils, on pedicels ± as long as the subtending leaves; corolla dirty yellow, brownish purple or dull pink, 2-lipped, with the upper lip 3-lobed and the lower lip consisting of 2 lobes. Capsule oblong-obovoid, remaining ± indehiscent. Seeds reticulate.

LL. Grassland and forest edges. Locally common. Flowers in the wet season.

Note. Subsp. *stellarioides*, differing in floral and fruit characters, is confined to southern Africa.

CAMPANULACEAE (152)

Annual or perennial herbs (in the Simen) or subshrubs or, rarely, small shrubs milky latex often present. Leaves alternate or rarely opposite; stipules absent. Inflorescences generally cymose, variously shaped, sometimes reduced to few or solitary flowers. Flowers bisexual, regular, mostly 5-merous. Calyx lobes persistent, valvate in bud. Corolla sympetalous. Stamens as many as and alternating with petals; anthers mostly free. Ovary inferior or subinferior, 2-10-locular, each locule with few to many ovules; style 1, in the upper part with pollen collecting hairs. Fruit a capsule variously dehiscing by apical or lateral valves or pores, often crowned with the persistent calyx lobes, or a berry (not in the Simen). Seeds 1 to many.

1 Capsule dehiscing by small basal valves; corolla blue to mauve or purple ..... *Campanula edulis*
Capsule dehiscing by means of apical valves; corolla white, white tinged with blue or lilac, or pale blue with darker veins 2

2 Usually ascending perennial herb, up to ca. 0.5 tall; leaves not in rosettes; flowers distinctly pedicellate, in few-flowered inflorescences or terminal, solitary; ovary 2-chambered, style 2-lobed ..... *Wahlenbergia silenoides*
Often mat-forming dwarf perennial with ± rosulate leaves; flowers solitary from leaf axils, sessile or almost so, ovary 3- chambered, style 3-lobed ..... *Wahlenbergia pusilla*

Wahlenbergia silenoides Hochst. ex A.Rich.
Perennial herb with usually ascending stems up to 60 cm tall. Leaves alternate or lower ones opposite, lanceolate to narrowly ovate, to ca. 2.5 cm long, sparsely denticulate. Inflorescences few-flowered, lax, often reduced to a solitary terminal flower; pedicels up to 3(-6) cm long. Corolla 4-6.5 mm long, white or white tinged with blue or lilac, deeply lobed. Ovary 2-chambered, subinferior; style with 2-lobed stigma shorter than the corolla. Capsule narrowly obconical, up to ca. 1.5 cm long, 2-valved. Seeds smooth.

UL. Afroalpine grassland and bushland. Uncommon. Flowers in the dry season.

Wahlenbergia pusilla Hochst. ex A.Rich.
Dwarf perennial herb, often mat-forming; with elongated rhizome, much branched in its upper part, each branch ending in a leaf rosette. Leaves oblanceolate to narrowly obovate or spathulate, to 2 cm long, margins with wavy teeth. Flowers sessile or almost so (but pedicels

Fig. D68. – A. Monopsis stellarioides *subsp.* schimperiana, *habit and flowers. – B,* Wahlenbergia silenoides, *flower. – C-D.* Campanula edulis, *C. habit, flower and fruits. D. stunted, purple-flowered form.*

much elongating in fruiting stage), solitary from leaf axils. Corolla 4-6.5 mm long, white or pale blue with darker veins, lobed to about 1/3 of the length. Ovary 3-chambered, subinferior; style with 3-lobed stigma shorter than the corolla. Capsule hemispherical, 3-valved. Seeds reticulate.

UL. Often in open, moist places in grass- and bushland. Rare. Flowers in wet season.

Note. Outside Ethiopia only known from Kenya and northern Tanzania.

Campanula edulis Forssk.

Perennial herb with decumbent to erect, hirsute stems to 70 cm long (usually much shorter). Leaves sessile, elliptic to oblanceolate, to 5 cm long, hirsute especially on the veins, margin entire to ± sparsely and obscurely dentate. Inflorescence lax, ± leafy, axes hirsute. Flowers blue to mauve or purple (rarely white); calyx lobes triangular, hirsute, often spreading-reflexed; corolla to ca. 2.5 cm long. Ovary usually 3-chambered; style and 3-lobed stigma shorter than the corolla. Capsule ± nodding, dehiscing by small basal valves.

UL. Exposed cliffs, in cracks of rocks; rocky grassland. Uncommon. Flowers in the dry season.

BORAGINACEAE (157)

Annual, biennial or perennial herbs, subshrubs, or, less commonly, shrubs or trees; usually all parts of the plant (rough) hairy, at least when young. Leaves alternate, simple; stipules

absent. Inflorescences often made up of scorpioid cymes but not uncommonly looking spike- or panicle-like. Flowers bisexual, regular (in the Simen), typically 5-merous. Sepals free to the base or fused below. Corolla sympetalous, the tube mostly short (in the Simen). Stamens as many as the corolla lobes, mostly fully included in the tube. Ovary superior, 2-carpellate; often 4-lobed, each lobe with a solitary ovule; style either basal, arising between the ovary lobes, or terminal. Fruits separating into 4 one-seeded nutlets or indehiscent and a ± fleshy drupe.

1 Tree; corolla funnel-shaped, large; fruits drupaceous ..... *Cordia africana*
Plants herbaceous ; corolla salver-shaped, small; fruits separating into 4 nutlets 2

2 Nutlets covered with at least a few glochids (barbed bristles) ..... 3 (*Cynoglossum*)
Nutlets smooth, shiny ..... 4 (*Myosotis*)

3 Leaves less than twice as long as wide; calyx divided to the middle; pedicels 2-3 times as long as calyx in fruit ..... *Cynoglossum amplifolium*
Leaves more than twice as long as wide; calyx divided to almost the base; pedicels shorter ..... *Cynoglossum coeruleum*

4 Annual herbs; corolla tube longer than calyx ..... *Myosotis abyssinica*
Perennial herbs; corolla tube as long as calyx ..... *Myosotis vestergrenii*

Cordia africana Lam.
Tree to 10 m or more tall; trunk usually branching a few meters from base; bark pale to dark brown, rough, fissured. Leaves petiolate, ovate to nearly orbicular, coriaceous. Flowers many in compact panicle-like inflorescences; calyx cylindrical-campanulate, longitudinally ribbed, with 5 teeth-like lobes; corolla white, funnel-shaped, ca. 2-2.5 cm in diam. Fruit a subglobose to ovoid yellow drupe ca. 1 cm long, enclosed by persistent calyx.

LL. Woodland, montane forest edges; edge of cultivated areas as solitary tree. Uncommon. Flowers in the wet season.

Cynoglossum amplifolium Hochst. ex DC.
Perennial herb with branched rhizome; stems to 2 m tall, branched above, rough-hairy. Leaves petiolate in lower part of stem, sessile and becoming progressively smaller higher up, rough-hairy on both sides; blades lanceolate to cordate-ovate, to ca. 15 cm long, less than twice as long as wide. Flowers few in loose cymes; pedicels short at anthesis, elongating in fruit; corolla pale blue, < 1 cm in diam., tube short, included in the calyx. Fruit of 4 nutlets, each covered by glochids over the entire surface.

ESC, **UL**. Grassy areas in *Erica* forest; rocky places. Common. Flowers in the wet season.

Cynoglossum coeruleum Hochst. ex A.DC. subsp. **coeruleum**
Perennial (infrequently annual or biennial) herb up to ca. 1 m tall; stems with spreading or deflexed hairs below. Leaves petiolate in lower part of stem, sessile and becoming progressively smaller and narrower higher up, sparsely to densely adpressed-hairy; blades narrowly obovate to elliptic-oblong, to ca. 20 cm long, always more than twice as long as wide. Flowers in axillary or terminal scarcely branched cymes, elongating in fruit; pedicels short; corolla blue, ca. 1 cm in diam., tube ± as long as calyx. Fruit of 4 compressed-ovoid nutlets, each with only few glochids.

UL. Grassland. Uncommon. Flowers in the wet season.

Note. A complex species aggregate, divided into subspecies in FEE. The typical subspecies is endemic to Ethiopia, while other subspecies, distinguished by leaf, flower and fruit characters, also occur elsewhere (subsp. *johnstonii*) or are not recorded for the country (subsp. *latifolium*).

Myosotis abyssinica Boiss. & Reuter
Erect annual herb; stems to 10 cm tall, tufted, bristly-hairs. Leaves shortly petiolate to sessile, (oblong-)lanceolate, to 2 cm long, adpressed-hairy. Flowers in short cymes; pedicels

shorter than calyx; corolla white, ca. 0.5 cm in diam., tube longer than calyx. Fruit of 4 smooth, shiny black nutlets.

UL. Grassland and *Erica*(*-Hypericum*) bushland; along watercourses. Rare. Flowering season unknown.

Myosotis vestergrenii Stroh

Perennial herb to c. 40 cm tall, ± stoloniferous; stems with scattered short bristly hairs. Leaves shortly petiolate to sessile, oblong-ovate (lower leaves) to oblong-lanceolate or lanceolate (upper leaves), to 4-5 cm long, hairy. Flowers in ± elongated inflorescences with numerous congested cymes (elongating in fruit); pedicels shorter than calyx; corolla pale to bright blue, ca. 0.5 cm in diam., tube as long as calyx. Fruit of 4 smooth nutlets.

UL. Damp to moist areas along watercourses or between rocks. Common. Flowers in the wet season.

Fig. D69. – A-B. Cordia africana. *A. habit. B. flowers. – C.* Cynoglossum coeruleum. *habit. flowers. – D-E,* Myosotis vestergrenii, *D, habit and flowers, E, detail.*

SOLANACEAE (158)

Herbs, sometimes climbing, shrubs or small trees, sometimes with vicious prickles and often variously hairy. Leaves alternate, simple and entire or variously lobed; stipules absent. Flowers solitary in leaf axils, extra-axillary, or in various forms of cymose inflorescences which may sometimes appear to be racemose or umbellate. Flowers bisexual or sometimes gynodioecious, regular or irregular (not in the Simen), 4- or 5-merous. Sepals ± fused. Corolla sympetalous, variously shaped (long tubular to open, star-like). Stamens as many as and alternating with the corolla lobes; anthers sometimes coherent (but not fused) and forming a tube (then opening by means of apical pores). Ovary superior, typically 2-chambered, with multiovulate placentas; simple style with entire or slightly 2-lobed stigma. Fruit a berry (in the Simen), a drupe or a capsule opening with 2 or 4 valves or by a lid.

1 Soft-wooded small tree; flowers urn-shaped, (greenish-)yellow, few to many in axillary fascicles ..... *Discopodium penninervium*
Herbs or shrubs; flowers rotate (corolla star-like), white, blue, pale violet or purplish, in cymose inflorescences ..... 2 (*Solanum*)

2 Shrub, nearly all parts of plant heavily armed with straight yellow prickles to > 1 cm long ..... *Solanum marginatum*
Erect, decumbent or prostrate herbs, glabrescent to variously hairy (but without large prickles) 3

3 Low prostrate herb with stout tap root and often a basal leaf rosette, densely white pubescent; inflorescences 2-3 flowered umbellate cymes; flowers lilac blue, purple or mauve ..... *Solanum hirtulum*
Usually erect herb neither with tap root nor leaf rosette, glabrescent to ± pubescent with appressed hairs; inflorescences 3-8-flowered lax cymes; flowers white or tinged purple ..... *Solanum nigrum*

Solanum nigrum L. subsp. **nigrum**

Usually erect, much branched herb up to 70 cm tall; glabrescent to moderately pubescent with appressed, eglandular hairs. Leaves petiolate, often with decurrent lamina, ovate to lanceolate, to 8 cm long, margin entire to sinuate-dentate. Flowers 3-8 in lax cymes appearing raceme-like. Corolla star-like, white or tinged purple, < 1 cm in diam. Berry broadly ovoid, dull purple to black when fully mature, 5-10 mm wide; many-seeded.

UL. Steep rocky grassland; ruderal areas. Common. Flowers in the dry season.

Note. A weed of possibly Eurasian origin, now distributed world-wide. Subsp. *schultesii* (with spreading glandular hairs) is common in warm, dry areas throughout Europe and Asia.

Solanum hirtulum Steud. ex A.Rich.

Low prostrate herb with tap root and often a basal leaf rosette; stems to ca. 20 cm long; all parts hirsute with long, white, spreading eglandular hairs. Leaves subsessile to shortly petiolate, spathulate, obovate or lanceolate, to 3 cm long, margin usually entire. Inflorescence leaf-opposed or extra-axillary, simple, consisting of 2-3-flowered umbellate cymes. Calyx densely hirsute, lobes broadly -triangular to –ovate, enlarging in fruit. Corolla star-like, lilac blue, purple or mauve, < 1 cm in diam. Berry globose, < 1 cm in diam.

LL. Grassland, montane forest edges; on river banks. Rare. Flowering season unknown.

Solanum marginatum L.f.

Much branched shrub to c. 1.5 m tall; nearly all parts of plant heavily armed with straight yellow prickles to > 1 cm long. Leaves petiolate, ovate, to > 20 cm long, sinuate to shallowly lobed, upper surface dark green, lower surface white tomentose. Inflorescence branched, up to ca. 10-flowered, on 1-3 cm long rachis; only the lowermost flower bisexual and fertile, the other functionally male; pedicel of the fertile flower thickening and elongating in fruit. Calyx lobes ± triangular, armed with prickles, enlarging in fruit. Corolla star-like, white or white tinged violet, ca. 2 cm in diam. Berry ± globose, yellow when fully mature, ca. 4 cm in diam.; many-seeded.

LL, **UL**. Edge of montane forest or scrub, or *Erica*(-*Hypericum*) bushland; also in waste places and abandoned fields. Common. Flowers in the wet season.

Note. Apparently occurring naturally in Ethiopia but in the Simen mostly an invasive weed.

Potatoes (***Solanum tuberosum***) are frequently cultivated around the villages in the Simen UL areas; both white- and pink-flowered cultivars were noted. – The species has apparently been introduced to Ethiopia prior to 1850.

Plants of ***Capsicum frutescens*** (cultivars of which are the hot chilli peppers) are often seen in and around Simen LL villages.

Discopodium penninervium Hochst.

Soft-wooded small tree to ca. 5 m tall; branchlets pubescent to flocculose, bark with numerous lenticels. Leaves petiolate, ovate to ovate-lanceolate, to ca. 20 cm long, margin entire, glabrescent when fully developed. Flowers few to many in axillary fascicles, pedicellate. Corolla urn-shaped, >1 cm in diam., (greenish-)yellow, with spreading-reflexed lobes. Berry globose, < 1 cm in diam., with numerous seeds.

UL. *Erica-Hypericum* forest and bushland. Common. Flowers in the dry season.

Fig. D70. – A-C, Solanum marginatum, *A, habit, B, flower, C, fruit. – D-E*, Discopodium penninervium, *D, habit, E, flowers.*

CONVOLVULACEAE (159)

Annual or perennial, sometimes climbing or twining herbs (in the Simen) or shrubs or trees. Leaves alternate, mostly simple, entire or often variously lobed; stipules absent. Inflorescences axillary, cymose, racemose or paniculate. Flowers bisexual (in the Simen), regular, often subtended by 1, 2 or more, sometimes conspicuous bracts, 5-merous. Sepals free or united below, persistent. Corolla sympetalous, variously shaped (long tubular to ± rotate, most commonly funnel-shaped). Stamens inserted on the corolla tube, as many as and alternating with the corolla lobes. Ovary superior, entire or 2-4-lobed, usually 2-4-chambered, often with a ring-like nectar-producing disk around the base; styles with simple, 2-fid or variously branched stigmas. Fruit capsular, opening by valves or irregularly, sometimes remaining indehiscent; each locule with 1 seed.

1 Prostrate annual or perennial herb, stems rooting at the nodes; flowers solitary in leaf axils, small (corolla < 0.5 cm long); pedicels much elongated in fruit, pushing the 1-seeded fruits into the soil ..... *Nephrophyllum abysssinicum*
Plants not with the above combination of characters 2

2 Perennial twining herb; corolla large, 3-4 cm long and 4-5 cm in diam. ..... *Convolvulus kilimandschari*
Annual herb; corolla smaller 3

3 Leaves lanceolate or oblong-lanceolate, 2-4 cm long, truncate or cuneate at the base; flowers white to blue, corolla 6-7 mm long ..... *Convolvulus siculus* subsp. *agrestis*
Leaves blade ovate to oblong-ovate, 2-7 cm long, broadly cordate or sometimes subhastate at the base; flowers usually pink or mauve with dark centre, corolla 10-13 mm long ..... *Ipomea sinensis* subsp. *blepharosepala*

Nephrophyllum abysssinicum Hochst. ex A.Rich. [syn. *Hygrocharis a.* (Hochst. ex A.Rich.) Hallier f.]

Annual or perennial herb; stems prostrate, rooting at the nodes. Leaves petiolate, kidney-shaped to suborbicular, to 1 cm long. Flowers pedicellate, solitary in leaf axils, small; corolla white to pink, campanulate, < 0.5 cm long, with 5 indistinct lobes. Capsule small (to ca. 0.5 cm in diam.), unlobed, globose, 1-seeded, on much elongated and thickened pedicel pushing it into the ground.

UL. Open grassland and open areas on steep rocky slopes. Rare. Flowers in wet season.

Note. The genus, with only a single species, is endemic to Ethiopia and Eritrea.

Convolvulus kilimandschari Engl.

Perennial twining herb with stems to several m long. Leaves petiolate, triangular, triangular-oblong or ovate, acute to ± acuminate at the apex, cordate at the base, to almost 10 cm long, glabrous. Flowers in dense cymes; corolla white with pink or purple streaks or pink with darker centre, 3-4 cm long and 4-5 cm in diam. Capsule ca. 7-8 mm long, 2-seeded.

LL, **UL**. Edge of (sometimes disturbed) montane scrub and forest. Uncommon. Flowers in the dry season.

Convolvulus siculus L. subsp. **agrestis** (Schweinf.) Verdc. (syn. *Evolvulus agrestis* Schweinf.)

Annual herb with unbranched or branched, erect or prostrate, pubescent stems to ca. 0.5 m long. Leaves petiolate, lanceolate or oblong-lanceolate, 2-4 cm long, acute or acuminate at the apex, truncate or cuneate at the base, a little hairy. Flowers up to 3 on peduncles arising in leaf axils, subtended by linear bracts to 1 cm long; sepals ovate-lanceolate, ca. 0.5 cm long; corolla white to blue, 6-7 mm long. Capsule 5-6 mm long, glabrous, 2-4-seeded.

LL. Woodland or wooded grassland; abandoned cultivated fields. Uncommon. Flowers in the wet season.

Note. Subsp. *siculus*, with shorter and broader bracts, occurs in the Mediterranean region. The taxon resembles and should not be confused with *Evolvulus alsinoides*. The latter, however, differs by having bright blue flowers with smaller sepals.

Fig. D71. – A-B, Nephrophyllum abysssinicum, *A, habit, B, detail showing geocarpic fruit on elongated pedicel. – C,* Convolvulus kilimandschari, *habit.*

Ipomea sinensis (Desr.) Choisy subsp. **blepharosepala** (A.Rich.) Meeuse (syn. *Ipomea blepharosepala* A.Rich.)

Annual herb with numerous prostrate or twining pilose stems to ca. 2 m long. Leaves petiolate, ovate to oblong-ovate, 2-7 cm long, obtuse to bluntly acute at the apex, broadly cordate or sometimes subhastate at the base, pubescent to glabrous. Inflorescence cymosely 1-3-flowered; peduncle slender, bracts minute. Flowers usually pink or mauve with dark centre, corolla 10-13 mm long; sepals unequal (outer ones ovate with cordate or subhastate base), becoming accrescent in fruit. Capsule globose, 5-6 mm in diam., glabrous, 4-seeded.

LL. Amongst tall grass in secondary woodland. Uncommon. Flowering season unknown.

Note. Subsp. *sinensis*, distinguished by white, larger corollas, occurs in E and southern Africa and in tropical Asia.

SCROPHULARIACEAE (160)

Annual, biennial or perennial herbs, subshrubs, shrubs or small trees. Leaves mostly opposite, simple, entire, rarely divided or pinnatifid to pinnate; stipules absent. Inflorescence a raceme or thyrse, without terminal flower. Flowers bisexual, irregular (zygomorphic) and often 2-lipped, sometimes only indistinctly zygomorphic and almost regular (actinomorphic), typically 5-merous. Sepals free to base or fused, regular or irregular, often 4-merous by reduction of the median sepal. Corolla sympetalous, the 2 upper petals often fused to form an upper lip opposite the lower lip with 3 lobes, throat of corolla often closed ("masked") by a palate, base of corolla sometimes forming a spur or with pouch-like widening. Stamens usually inserted in corolla tube, sometimes 5 but most commonly 4 (the 5th median stamen reduced to a staminode or absent) or only 2 (due to further reduction of the 2 anterior stamens to staminodes or lacking). Ovary superior, 2-chambered. Fruit a capsule with septicidal, loculicidal or poricidal dehiscence, rarely a berry (*Halleria* in the Simen) or drupe. Seeds numerous to few, smooth, reticulate or with variously ornate surface.

1 Shrub or small tree up to 3 m tall; flowers red to orange-red; fruit a berry, blackish-purple when ripe .... *Halleria lucida*
Herbs or subshrubs, neither with red to orange-red flowers nor berries 2

2 Small aquatic plants with basal rosettes of fleshy, spathulate leaves; plants usually with stolons, ending in new rosette; corollas lilac to mauve, very small (< 5 mm long), subrotate .... *Limosella major*
Non-aquatic or, rarely, semi-aquatic plants not with the above combination of characters 3

3 Leaves linear, all alternate; corolla 4-lobed, white with orange centre; calyx with unequal lobes; fruits splitting into two mericarps ..... *Hebenstretia angolensis*
Plants not with the above combination of characters 4

4 Corolla distinctly 2-lipped 5
Corolla zygomorphic (or slightly so) but not 2-lipped 7

5 Leaves alternate, at least some 3-fid ..... *Anarrhinum forskaohlii* subsp. *abyssinicum*
Leaves opposite, unlobed 6

6 Tufted perennial subshrub, up to 1 m tall; corolla greenish-yellow to deep yellow often with reddish veins ..... *Bartsia decurva*
Erect, mostly unbranched annual herb, up to 60 cm tall; corolla white tinged purple ..... *Bartsia trixago*

7 Subshrub with many erect stems; flowers in bracteate terminal racemes; corolla mostly pink, subrotate, with slightly unequal, ± erect lobes ..... *Hedbergia abyssinica*
Plants not with the above combination of characters 8

8 Corolla yellow, subrotate, only indistinctly zygomorphic (the upper 2 lobes slightly shorter than lower 3 lobes) ..... 9 (*Verbascum, Rhabdotosperma**)
Corolla not as above (if yellow, corolla salver-shaped, with curved tube inflated above) 15

9 Intricately branched small shrubs; fruiting pedicels rigid, persistent, becoming spinescent ..... *Verbascum arbusculum*
Growth form not as above; plants not spinescent 10

10 Plants silvery-grey in appearance (all parts densely greyish tomentose); leaves all entire and sessile; inflorescence with many- flowered, glomerulous fascicles; flowers subsessile, anthers pilose with dark yellow hairs ..... *Verbascum stelurum*
Plants not with the above combination of characters; inflorescences a lax raceme; flowers distinctly pedicellate, anthers pilose with purple-violet hairs 11

11 Leaves all entire 12
At least some leaves pinnatifid, pinnate or 3-foliate 13

12 Pedicels 2-3 times longer than bracts ..... *Verbascum benthamianum*
Pedicels, even in fruit, shorter than or only as long as bracts ..... *Rhabdotosperma scrophulariifolia*

13 Leaves mostly in a basal rosette, pinnatifid, not rugose ..... *Verbascum interruptum*
Leaves not in basal rosette (if pinnatifid then leaves distinctly rugose) 14

14 Lower stem leaves pinnate or 3-foliolate; corolla small, ca. 1.5 cm in diam. ..... *Verbascum pubescens*
Lower stem leaves pinnatifid, rugose; corolla large, ca. 2.5-3 cm in diam. ..... *Rhabdotosperma brevipedicellata*

15 Corolla yellow, white or pink, with a slightly curved tube ca. 2-5 cm long and a 4-lobed limb ca. 1.5-3 cm in diam. ..... *Cycniopsis humilis*
Corolla mostly blue, pale blue to white or lilac, (sub)rotate with a very short tube, much smaller ..... 16 (*Veronica*)

16 Inflorescences lateral 17
Inflorescence terminal 18

17 Inflorescence lax, bracteate, 20-40-flowered; stems stout, ± fleshy; leaves (at least upper ones) sessile; plants of wet, marshy places ..... *Veronica anagallis-aquatica*
Inflorescence lax, 2-7-flowered, bracteoles absent; stems slender, not fleshy; leaves petiolate; plants not in wet places ..... *Veronica abyssinica*

18 Annual herb, < 10 cm tall; leaves to 1 cm long ..... *Veronica simensis*
Perennial herb, up to 50 cm tall; leaves > 1 to 3 cm long ..... *Veronica glandulosa*

* The two genera, only reliably separable by having seeds with small holes over the whole surface (*Verbascum*) or seeds with longitudinal furrows (*Rhabdotosperma*), are treated as distinct entities in FEE but this is not generally accepted; more often, *Rhabdotosperma* is included in *Verbascum*.

Anarrhinum forskaohlii (Gmelin) Cufod. subsp. **abyssinicum** (Jaub. & Spach) D.A.Sutton
Erect perennial herb, glandular-pubescent throughout. Leaves alternate; basal leaves usually falling soon, entire, serrate, stem leaves 3-lobed, to 4.5 cm long. Inflorescence lax,

Fig. D72. – Verbascum stelurum, *A, habit, B, partial inflorescences with flowers.*

simple or branched. Flowers pedicellate (pedicels elongating in fruit); corolla (yellowish-) white, 2-lipped and with cylindrical tube, to ca. 0.5 cm long. Capsule globose, glabrous, ca. 2-2.5 mm in diam.

LL. Rocky places in montane grassland. Uncommon. Flowers in the wet season.

Note. New record for the Simen. The subspecies is endemic to Ethiopia and Eritrea; subsp. *forskaohlii* is widespread in the Eastern Mediterranean and South West Asia.

Verbascum stelurum Murbeck

Biennial herb up to ca. 1 m tall (incl. inflorescences); stems erect, mostly with a few ascending to erect branches arising near the base; all parts densely greyish-tomentose. Leaves all entire, sessile, oblong or ovate-oblong, to > 20 cm long, margins sharply dentate with broadly triangular teeth; cauline leaves similar to basal leaves. Inflorescences long and unbranched, with many sessile, multi-flowered glomerulous fascicles (partial inflorescences) along the main axes. Corolla yellow, subrotate, ca. 2.5 cm in diam.; stamens 5, subequal, filaments reddish, pilose with yellowish hairs. Capsule elliptic or ovoid, < 1 cm long, shorter than the persistent calyx.

UL. Rocky hillsides. Rare. Flowers in the dry season.

Note. Endemic to Ethiopia. Appears to be very close to the widely distributed *V. sinaiticum* (which, however, is not recorded for the Gondar Floristic Region).

Verbascum pubescens (Skan) Huber-Morath [syn. *Celsia pubescens* (Skan) Murbeck]

Biennial or perennial herb up 70 cm tall, densely pubescent with short, simple, unbranched hairs; stem simple, with few leaves. Leaves all petiolate; lower stem leaves pinnate or 3-foliolate, to 10 cm long, lateral segments up to 2 cm long, ovate or oblong-elliptic, terminal segment to 5 cm long, ovate to oblong, double crenate with ovate-rotundate or subtruncate base; upper leaves either 3-foliolate or entire. Inflorescence a lax raceme, pedicels 2-3 times longer than subtending bracts, to ca. 1.5 cm long in fruit. Corolla yellow, subrotate, ca. 1.5 cm in diam.; stamens 4, anterior (abaxial) stamens longer than posterior (adaxial) ones, pilose with purple-violet hairs. Capsule globose, < 5 mm in diam.

UL. Habitat unknown. Rare. Flowering season unknown.

Note. Endemic to Simen Mountains. Only known from the type collection.

Verbascum benthamianum Hepper (syn. *Celsia floccosa* Benth.)
Subshrub to 1 m tall, with simple or little-branched, ± erect leafy stems from a woody base. Leaves all entire; lower leaves (shortly) petiolate, oblong or elongate-lanceolate, to 15 cm long, subcordate at base, margins regularly dentate; upper leaves ± sessile, (much) smaller. Inflorescence a lax raceme; pedicels 2-3 times longer than subtending bracts, to ca. 3 cm long in fruit. Corolla yellow with reddish markings around the centre, subrotate, the 2 upper lobes slightly shorter than lower 3 lobes, ca. 2-3.5 cm in diam.; stamens 4, anterior (abaxial) stamens longer and much thicker than posterior (adaxial) ones, pilose with purple-violet hairs. Capsule conical-ovoid, to 1 cm long.
UL. Mountain slopes and rocks. Common. Flowers in the dry season.
Note. Endemic to the Simen.

Verbascum arbusculum (A.Rich.) Huber-Morath (syn. *Celsia arbuscula* A.Rich.)
Intricately branched small shrubs up to 40 cm tall, spinescent due to thick fruiting pedicels which persist and become rigid and sharp-tipped. Leaves only on young branches, (sub)sessile, ovate-elliptic, to 1.5 cm long, margins coarsely crenate. Inflorescence a few-flowered lax raceme; bracts minute; pedicels thick, elongating to ca. 2.5 cm in fruit. Corolla yellow with dark purplish-red spots around the centre, subrotate, the 2 upper lobes slightly shorter than lower 3 lobes, ca. 1.5 cm in diam.; stamens 4 (the 5th sometimes present but reduced), anterior (abaxial) stamens longer than posterior (adaxial) ones, pilose with purple-violet hairs. Capsule ovoid, ca. 5 mm long.
UL. Rocky outcrops, rocky areas in afroalpine grassland. Rare. Flowers in the dry season.
Note. New record for the Simen; previously only known from Shewa Uplands. Endemic to Ethiopia.

Verbascum interruptum (Fres.) Kuntze (syn. *Celsia interrupta* Fres.)
Biennial herb to ca. 0.5 m tall; stem simple or only sparsely branched. Leaves mostly in a basal rosette, petiolate, pinnatifid, lateral segments 1-3 on each side, oblong, crenate-dentate, terminal segment much larger and longer than lateral segments, rhachis between segments often with minute lobes; the few upper leaves sessile, pinnatifid. Inflorescence a lax raceme; pedicels 2-4 times longer than subtending bracts, to ca. 1-2 cm long in fruit. Corolla yellow, subrotate, ca. 1-1.5 cm in diam.; stamens 4 (the 5th sometimes present but reduced), anterior (abaxial) stamens longer and thicker than posterior (adaxial) ones, densely covered with purple-violet hairs. Capsule subglobose, ca. 5 mm in diam.
LL. Montane rocky grassland. Rare. Flowering season unknown.
Note. Outside the Simen only known from the Marsabit area in Kenya.

Rhabdotosperma scrophulariifolia (Hochst. ex A.Rich.) Hartl [syn. *Celsia s.* Hochst. ex A.Rich., *Verbascum s.* (Hochst. ex A.Rich.) Huber-Morat]
Perennial herb, to ca. 1 m tall; stem erect, simple or rarely branched. Leaves all entire; lower leaves petiolate, oblong, to ca. 10 cm long, margins irregularly or double crenate; upper leaves sessile, often narrower, smaller. Inflorescence a lax raceme; pedicels shorter than or only as long as the subtending bracts, ca. 0.5-3 cm long in fruit. Corolla yellow, subrotate, 2-2.5 cm in diam.; stamens 4 (the 5th sometimes present but reduced), anterior (abaxial) anthers only slightly longer than posterior (adaxial) ones, filaments bearded. Capsule pyriform to ovate, to ca. 1 cm long.
LL. Grassland and montane scrub. Uncommon. Flowers in the dry season.
Note. Widespread in the Ethiopian highlands; outside the Simen only recorded from Kenya.

Rhabdotosperma brevipedicellata (Engl.) Hartl [syn. *Celsia b.* Engl., *Verbascum b.* (Engl.) Huber-Morath]
Perennial herb or subshrub to 1.5 m tall; stem erect, simple or only sparsely branched, elongate, many-leaved. Leaves rugose; lower stem leaves petiolate, oblong, at least some

Fig. D73. – A-D, Verbascum *spp.; A-B,* V. benthamianum, *A, habit, B, detail; C-D,* V. arbusculum, *C, habit (note spinescent old pedicels), D, flower.*

pinnatifid with 1-2 small lateral segments, margins crenate; upper leaves sessile, oblong or oblong-lanceolate, smaller. Inflorescence a lax raceme; pedicels 2-3 times longer than subtending bracts, to ca. 1-2 cm long in fruit. Corolla yellow, subrotate, 2.5-3 cm in diam.; stamens 4, anterior (abaxial) anthers about twice as long as posterior (adaxial) ones, filaments densely bearded. Capsule elliptic, to ca. 1 cm long.

UL. Grassland and *Erica* scrub. Uncommon. Flowers in the dry season.

Hebenstretia angolensis Rolfe [*H. dentata* sensu auctt., non L.]
Perennial herb or subshrub with erect, glabrous, usually richly branched stems up to ca. 0.5 m tall. Leaves alternate, sessile, linear, to ca. 4 cm long. Inflorescence terminal, racemose, dense, with many sessile flowers. Corolla white with orange(-reddish-brown) throat, tube < 5 mm long, lobes 4. Fruits splitting into two mericarps, < 5 mm long.

UL. Rocky outcrops, in cracks of rocks; grassland. Common. Flowers in the wet and dry season.

Halleria lucida L.
Shrub or small tree to ca. 3 m tall. Leaves opposite, petiolate, broadly ovate, coriaceous, 4.5-10 cm long. Flowers pedicellate, in axillary fascicles (these often also on older, leafless branches); corolla orange-red to red, tube curved, to ca. 3 cm long, lobes short, upper lip 2-lobed, lower lip shortly 3-lobed. Berry ovoid to subglobose, blackish-purple when ripe.

LL. Edge of montane forest patches; along streams. Common. Flowers in the wet season.

Limosella major Diels [*L. africana* sensu auctt., non Glück, *L. aquatica* sensu auctt., non L.]
Small aquatic perennial herb with basal leaf rosette; usually with stolons producing new leaf rosettes at their apex. Leaves spathulate, slightly fleshy, to ca. 4 cm long. Flowers solitary on ± erect pedicels to ca. 5 cm long; corolla mauve with violet spots, subrotate, to ca. 5 mm in diam. Capsules very small, < 5 mm long.

UL. In ponds and along watercourses in afroalpine vegetation. Uncommon. Flowers throughout the year.

Veronica simensis Fresen.
Small pubescent annual herbs < 10 cm tall; stems mostly procumbent to ascending. Leaves opposite below and usually alternate above, shortly petiolate, broadly ovate, to 1 cm long, margins crenate-serrate. Flowers distinctly pedicellate, in lax, racemose terminal inflorescences with leaf-like bracts (flowers thus seemingly solitary in leaf axils); calyx of 2 pairs of lobes; corolla blue to white, 2-4 mm in diam. Capsule small, compressed, 2-lobed, mostly 2-seeded.

UL. Grassland. Uncommon. Flowers in the wet season.

Note. Endemic to Ethiopia.

Veronica glandulosa Hochst. ex Benth.
Perennial herbs up to 50 cm tall, glandular-pubescent or sometimes nearly glabrous to densely greyish white-pilose; stems procumbent to ascending, the flowering branches erect. Leaves opposite, very shortly petiolate, ovate(-elliptic), to 3 cm long, margins sparsely crenate-serrate. Flowers distinctly pedicellate, in lax, racemose terminal inflorescences with leaf-like bracts (flowers thus seemingly solitary in leaf axils); calyx with 2 longer lower and 2 shorter upper lobes; corolla blue to rose or salmon-red, rotate, slightly zygomorphic, ca. 1 cm in diam. Capsule compressed, obcordate, 4 x 3 mm, shorter than calyx.

UL. Afroalpine grassland. Uncommon. Flowers in the wet season.

Veronica abyssinica Fresen.
Densely villose annual herbs herb up to 40 cm tall; stems slender, procumbent. Leaves opposite, petiolate, broadly ovate or orbicular, to ca. 4 cm long, margins coarsely crenate-serrate. Flowers distinctly pedicellate, without bracteoles, 2-7 in lax, racemose lateral inflorescences; calyx 5-lobed; corolla bluish, rotate, slightly zygomorphic, bluish, 6-7 mm in diam. Capsule as in *V. glandulosa*.

UL. Ericaceous scrub; afroalpine grassland. Uncommon. Flowers in the wet season.

Fig. D74. – A-B, Hebenstretia angolensis, *A, habit, B, detail of inflorescence. – C*, Halleria lucida, *leafless branch with flowers (one past anthesis). – D*, Limosella major, *habit, note flowers. – E-F*, Veronica glandulosa, *E, habit, F, flowers.*

A
B
C
D
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F

Veronica anagallis-aquatica L.
Glabrous or glandular-pubescent annual or perennial herbs to ca. 50 cm tall; stems erect, ± fleshy, often with thick, hollow creeping vegetative branches near base. Leaves opposite, lower shortly petiolate, upper sessile and ± amplexicaul, ovate, elliptic or oblong, to ca. 7 cm long, margins entire to ± serrate. Flowers distinctly pedicellate, 20-40 in lax, racemose, bracteate lateral inflorescences; calyx 4-lobed, divided to the base; corolla lavender to pale blue or pale lilac, ca. 5 mm in diam. Capsule orbicular, inflated, ca. 3 mm in diam.

UL. Wet, marshy places along watercourses or at the edge of ponds. Locally common. Flowers in the dry season.

Cycniopsis humilis (Hochst. ex Benth.) Backlund, Hunde & Langström (syn. *Rhamphicarpa h.* Hochst. ex Benth.)
Perennial herbs with procumbent stems to ca. 20 cm long. Leaves opposite, sessile, lanceolate to oblong-elliptic, to 2 cm long, margins entire. Flowers subsessile; corolla yellow, (rarely white or pink in the area), with a slightly curved tube ca. 2-5 cm long and a 4-lobed limb ca. 1.5-3 cm in diam., upper lip large due to fusion of two adjacent lobes. Capsule ovate, compressed, < 5 mm long, ± beaked.

UL. Grassland, rocky places. Rare. Flowers in the wet season.

Note. Endemic to Ethiopia.

Hedbergia abyssinica (Hochst. ex Benth.) Molau [syn. *Bartsia abyssinica* Hochst. ex Benth., *Bartsia petitiana* (Rich.) Hemsl.]
Subshrub to c. 2 m tall, with many erect stems. Leaves opposite, sessile, elliptic to lanceolate, ca. 5-10 mm long, densely pubescent, margins revolute. Flowers shortly pedicellate, in dense terminal racemes; corolla mostly pink, subrotate, with slightly unequal, ± erect lobes. Capsule with loculicidal dehiscence, to ca. 1 cm long; seeds numerous, with longitudinal wings.

UL. Afroalpine grassland, sometimes in rocky areas or along streams. Common. Flowers in the wet season.

Bartsia decurva Hochst. ex Benth.
Tufted perennial subshrub up to 1 m tall, with erect or ascending, sparsely branched stems. Leaves densely crowded in upper part, early falling in lower part, ovate, lanceolate or narrowly triangular, ca. 10-35 mm long, puberulous to sparsely villous, with mostly glandular hairs, margins revolute. Flowers shortly pedicellate, in dense terminal racemes; corolla greenish-yellow to deep yellow, often with reddish veins, tube distinctly decurved, to ca. 2 cm long, 2-lipped, lower lip deflexed. Capsule with loculicidal dehiscence, ovoid, to 1.5 cm long; seeds numerous, with longitudinal wings.

UL. Afroalpine grassland, sometimes in rocky areas. Uncommon. Flowers in the wet season.

Bartsia trixago L. [syn. *Bellardia trixago* (L.) All.]
Annual herb up to 60 cm tall, with erect, mostly unbranched stems. Leaves widely spaced, sessile, lanceolate, to ca. 4 cm long, coarsely dentate. Flowers subsessile, in dense foliose terminal spikes; corolla white to yellowish with purplish-tinged upper lip, tube straight, upper lipt to ca. 1 cm long, lower lip deflexed. Capsule with loculicidal dehiscence, ovoid or subglobose, to 1 cm long; seeds numerous, with longitudinal wings.

UL. Steep, eroded slopes; disturbed grassland and *Erica* scrub. Uncommon. Flowers in the wet season.

Note. A cosmopolitan weed, originally from the Mediterranean region; in Africa apparently only introduced to Ethiopia and Kenya.

Fig. D75. – A, Cycniopsis humilis, *habit, flowers. – B-C*, Hedbergia abyssinica, *B, habit, C, flowers. – D-E*, Bartsia decurva, *D, habit, E, flowers. – F-G*, Bartsia trixago, *F, habit, G, flowers.*

A
C
B
E
D
F
G

OROBANCHACEAE (161)

Fleshy, mainly annual herbs lacking chlorophyll and wholly parasitic on the roots of other higher plants. Stems pale yellow/brown, often tinged with purple, usually glandular-hairy; stem base thickened at main attachment to host root. Leaves reduced to scales, alternate. Inflorescence a terminal bracteose raceme or spike, often occupying half or more of the above-ground stem. Flowers bisexual, irregular. Sepals fused, with 2-5 lobes or divided into 2 lateral segments. Corolla sympetalous, tubular, ± 2-lipped, the upper lip entire or with 2 lobes, the lower 3-lobed. Stamens 4, attached to the lower inside of corolla tube. Ovary superior, 1-chambered, consisting of 2 carpels with numerous ovules on 4 placentae; style simple with 2-lobed stigma. Fruit a capsule dehiscing into 2 valves. Seeds minute.

Orobanche minor Smith

Parasitic herb to c. 30 cm tall with yellowish-brown, succulent stems; stems and leaves hairy. Leaves scale-like, brownish, to ca. 1 cm long. Flowers ± many in terminal dense to ± lax racemes; corolla < 2 cm long, tubular below and with short lobes above, pale purplish blue to whitish. Capsule ovoid-ellipsoid, to ca. 1 cm long.

UL. Parasitic on roots of herbs of various families (especially Leguminosae and Compositae); in rocky grassland and in grass- and woodland mosaic, also in heavily grazed, disturbed grassland. Rare. Flowers in the wet season.

BIGNONIACEAE (165)

Trees (in the Simen), shrubs or sometimes climbers. Leaves opposite, rarely verticillate, pinnately compound; stipules absent. Inflorescences terminal or axillary, variously shaped, many- to 1-flowered. Flowers 5-merous, bisexual, irregular, usually large and showy. Sepals fused. Corolla sympetalous, campanulate to funnel-shaped, above often ± 2-lipped (upper lip with 2 lobes, the lower with 3). Stamens attached to corolla, 4 fertile + 1 reduced. Ovary superior, 2-chambered, with many ovules per chamber; style simple, with 2-lobed stigma. Fruit usually an elongated, slender capsule dehiscing into 2 valves; the numerous winged seeds often borne on a central replum.

Stereospermum kunthianum Cham.

Deciduous, small to medium sized tree up to 15 m tall, flowering in leafless state; trunks with grey to whitish flaking bark. Leaves pinnate, with usually 2-4 pairs of oblong(-elliptic) leaflets, each to ca. 10 cm long. Flowers fragrant, in large terminal panicles; corolla with funnel-shaped tube to ca. 4 cm long and 5 unequal crumpled lobes, (pale) pink with darker markings on the inside. Capsule narrowly cylindrical, twisted, to over 0.5 m long; seeds winged at each end, to ca. 2.5 cm long.

LL. Woodland or woodland remnants. Uncommon. Flowers in the dry season.

ACANTHACEAE (167)

Annual to perennial herbs, shrubby herbs or shrubs, sometimes climbers (not in the Simen). Leaves opposite (decussate), simple, often entire, sometimes dissected; stipules absent. Inflorescences terminal or axillary, many- to few-flowered, consisting of cymose units or raceme-like, frequently condensed in the leaf axils, bracteose (bracts and bracteoles often showy). Flowers mostly 4- or 5-merous, bisexual, irregular (sometimes indistinctly so). Sepals fused, at least near the base. Corolla sympetalous, tubular, funnel-shaped or ± campanulate below, often indistinctly to distinctly 2-lipped above (upper lip with 1-2 lobes, the lower with 3; upper lip sometimes suppressed, e.g. *Acanthus* in the Simen). Stamens attached to corolla, 4 (then 2 often longer than the others) or 2. Ovary superior, 2-chambered, with 2 to several ovules per chamber; style simple, with distinctly or indistinctly 2-lobed stigma. Fruit usually a loculicidal capsule, often with explosive dehiscence. Seeds borne on hook-like or hardened outgrowths.

Fig. D76. – A-B, Orobanche minor, *A, habit, B, detail. – C-E,* Stereospermum kunthianum, *C, fruiting tree. D. fruits. E. flowers*

1 Flowers showy, red, in terminal spike-like inflorescences, floral bracts spiny; erect shrubby herb with spiny leaves; corolla 1-lipped; calyx 4-lobed ..... *Acanthus sennii*
Plants not with the above combination of characters; flowers never showy red; corolla 2-lipped or almost regularly 5-lobed; calyx 5-lobed 2

2 Axillary flower clusters with some vicious, straight spines; herb of swampy or seasonally wet areas ..... *Hygrophila schulli*
Plants not with the above combination of characters; never with spines 3

3 Shrubby herb with bell-shaped, almost regular pale pink flowers; corolla with dark reddish-purplish markings on the inside ..... *Acanthopale aethiopica*
Plants not with the above combination of characters; flowers never distinctly bell-shaped 4

4 Herb with long glandular hairs at least on the inflorescence axes and on the calyces of the flowers; corolla tube broadly funnel-shaped, corolla lobes ± unequal ..... *Mimulopsis solmsii*
Plants not with the above combination of characters; plants never with long glandular hairs 5

5 Corolla ± funnel-shaped, lobes subequal; stamens 4 ..... *Asystasia gangetica* subsp. *micrantha*
Corolla distinctly 2-lipped; stamens 2 6

6 Upper lip 2-lobed, hood-like, covering the anthers; lower lip 3-lobed, spreading .... *Justicia ladanoides*
Upper lip reflexed, lower lip spreading to recurved ..... 7 (*Hypoestes*)

7 Usually 3 white to pale mauve flowers in pedunculate axillary clusters ..... *Hypoestes triflora*
Flowers many in elongated, spike-like inflorescences ..... *Hypoestes forskaolii*

Acanthopale aethiopica Ensermu (ined.)
Weak, erect, much-branched shrub to ca. 1 m tall. Leaves opposite, elliptic, to ca. 10 cm long, gradually narrowed at base and apex. Inflorescences raceme-like, bracteate, small, axillary and terminal. Corolla almost regular, bell-shaped, to ca. 3 cm long, pinkish-white, spotted and lined purplish within, lobes small, reflexed. Stamens 4, not joined in pairs. Capsule elongated-lanceolate.

LL. Edge of wet montane forest; in damp, shady gullies. Locally common. Flowers in the wet season.

Note: New record for the Simen; endemic to Ethiopia.

Mimulopsis solmsii Schweinf.
Trailing woody herb; stems to ca. 50 cm long; densely covered with long glandular hairs. Leaves opposite, long-petiolate, ovate, to ca. 5 cm long, rounded to cordate at the base, margins serrate to crenate. Inflorescences open, paniculate, terminal, bracteate and bracteolate. Calyx almost free to the base, lobes linear. Corolla broadly funnel-shaped, to ca. 3 cm long, with 5 nearly equal lobes, pale blue (lowermost lobe with yellow spot), lined purplish inside. Stamens 4, anthers barely exserted from the throat. Capsule 6-8-seeded; seeds orbicular.

LL, **UL**. Wooded gullies, shady places along streams. Common. Flowers in the wet season.

Hypoestes triflora (Forssk.) R.Br. ex Soland & Schult.
Straggling annual herb to ca. 0.75 m tall. Leaves opposite, petiolate, elliptic, to ca. 7 cm long, margins serrate. Inflorescences consisting of axillary, pedunculate, 3(-2-1)-flowered clusters. Calyx subequally 5-fid, lobes subacute. Corolla white to pale mauve, distinctly 2-lipped, upper lip reflexed, lower lip spreading to recurved; stamens 2. Capsule ellipsoid, 4-seeded; seeds discoid.

LL, **UL**. Wooded gullies; rocks along watercourses. Common. flowers in the wet season.

Hypoestes forskaolii (Vahl) R.Br.
Erect perennial herb to ca. 1 m tall. Leaves opposite, petiolate, ovate-elliptic to elliptic, to ca. 10 cm long, margins ± entire. Inflorescences elongated, spike-like, composed of many closely spaced, few-flowered cymes; individual flowers subtended by a pair of bracteoles.

Fig. D77. – A-B, Acanthopale aethiopica, *A, branch with flowers, B, detail. – C-D,* Mimulopsis solmsii, *C, habit, D, flowers. – E,* Hypoestes forskaolii, *inflorescence and flowers.*

Calyx lobes subequal, ± linear. Corolla pink with dark purple and white markings, distinctly 2-lipped, upper lip reflexed, lower lip spreading to recurved; stamens 2. Capsule ellipsoid, 4-seeded; seeds discoid.

LL. Rocky areas; secondary montane scrub. Common. Flowers in the wet season.

Justicia ladanoides Lam.
Small stunted herb to ca. 10 cm tall; stems trailing to ascending, arising from a woody rootstock. Leaves opposite, subsessile, elliptic-lanceolate, to ca. 3 cm long, margins entire. Flowers relatively few in terminal and axillary clusters. Calyx tubular below, lobes linear-lanceolate. Corolla white, distinctly 2-lipped; upper lip 2-lobed, hood-like, covering the anthers, lower lip 3-lobed, spreading. Capsule 2-seeded.

UL. Afroalpine grassland, often in heavily grazed and disturbed areas. Common. Flowers in the wet season.

Hygrophila schulli (Hamilt.) M.R.Almeid & S.M.Almeid
Sparingly branched erect annual herb; stems to ca. 20 cm tall, 4-angled. Leaves opposite, shortly petiolate, narrowly elliptic, to ca. 8 cm long, margins entire. Flowers in axillary sessile clusters, each with a few to several stout, vicious spines and oblong-elliptic bracts. Corolla pink, bluish-mauve or white, distinctly 2-lipped, upper lip 2-lobed, lower lip 3-lobed. Stamens 4, in 2 unequal pairs. Capsule linear-oblong, with numerous discoid seeds.

LL. Swampy, seasonally wet and waterlogged areas in grassland. Common. Flowers in the wet season.

Asystasia gangetica (L.) T.Anders. subsp. **micrantha** (Nees) Ensermu
Trailing herb with stems to ca. 75 cm long. Leaves opposite, petiolate to subsessile, ovate, to ca. 8 cm long, rounded to ± cordate at the base, margins entire. Inflorescences terminal, one-sided racemes; small bracts and bracteoles present. Calyx nearly free to the base, lobes minutely glandular. Corolla white (turning yellowish with age) or pale purplish, ± funnel-shaped, to ca. 3 cm long, with 5 nearly equal lobes. Stamens 4, not distinctly exserted from the throat. Capsule 4-seeded.

LL. Typically in disturbed sites in and around villages; sometimes in secondary grassland. Locally common. Flowers in the wet season.

Acanthus sennii Chiov.
Stout, erect shrubby herb or sub-woody shrub to ca. 2 m tall. Leaves opposite, (shortly) petiolate, oblong-elliptic in outline, to ca. 20 cm long, deeply pinnatifid, with spiny margins. Inflorescence terminal, spike-like, condensed, to ca. 10 cm long; bracts lanceolate, acuminate, spiny on the margins, persistent. Corolla distinctly 2-lipped; upper lip small and inconspicuously colored, lower lip 4-lobed bright red. Stamens 4, in 2 ± unequal pairs, positioned underneath the upper lip. Capsule to ca. 2 cm long.

LL. In secondary scrub and often at the edge of abandoned fields; also at forest margins. Common. Flowers in the wet season.

Note. Endemic to Ethiopia.

VERBENACEAE (169)

Herbs, shrubs or trees; young stems often 4-angled. Leaves predominantly opposite, sometimes whorled, rarely alternate, often strongly aromatic, without stipules. Inflorescences terminal or axillary, many- to few-flowered, variously shaped; ultimate elements cymose to racemose. Flowers (4-)5-merous, ± irregular, frequently ± 2-lipped. Sepals united to form a tube or cup. Corolla sympetalous, tubular below. Stamens 4, attached to the corolla. Ovary superior, usually 2-chambered, each chamber containing 1-2 ovules; the simple style terminal on top of the ovary, stigma usually ± lobed. Fruit a fleshy drupe, less often dry and a capsule or dividing at maturity into 2 or 4 nutlets.

Clerodendrum, traditionally and in most Floras (incl. Flora of East Tropical Africa) included in Verbenaceae, has – in accordance with the most recent classification systems – been transferred to Lamiaceae (see below).

Fig. D78. – A-B. Hygrophila schulli, *A, habit, B, detail of flower cluster. – C,* Asystasia gangetica *subsp.* micrantha, *habit and flowers. – D-E,* Acanthus sennii, *D, habit, E, inflorescence and flowers.*

A
B
C
D
E

Lippia adoensis Hochst. ex Walp. var. **adoensis**
Erect woody herb or shrub up to 2 m tall, stems angled, hairs. Leaves in whorls of 3-4, elliptic to elliptic-oblanceolate, rough above, with ± dense, pale hairs beneath, aromatic. Inflorescences head-like, in ± umbel-like arrangement in leaf axils and terminal. Flowers subtended by ± large hairy bracts, pink, corolla 2-lipped. Fruit dry hard, separating into 2 bony nutlets.

LL. Edge of montane scrub; disturbed places such as around abandoned fields. Common. Flowers in the wet season.

LAMIACEAE (LABIATAE) (170)

Herbs or sometimes shrubs (in the Simen); young stems usually 4-angled; mostly fragrant or odoriferous. Leaves decussate (opposite) or sometimes whorled, mostly simple and dentate, occasionally lobed; without stipules. Inflorescence thyrsoid, mostly with two 1- to many-flowered cymes per node (these forming a *verticillaster*), or less commonly racemoid; lax to dense and head-like; bracts foliage leaf-like or distinctly smaller. Flowers pedicellate or sessile, mostly bisexual, usually irregular. Sepals mostly fused, tubular, campanulate or sometimes funnel-shaped. Corolla sympetalous, tubular below, (1-)2-lipped and/or (3-)4-5-lobed. Stamens 4 (rarely 2), attached to the corolla; the posterior pair sometimes sterile, dwarfed or absent, the anterior pair often longer. Ovary superior, mostly deeply 4-lobed, 4-chambered with 1 erect ovule in each, the simple style arising from between the lobes; stigma mostly 2-fid. Fruit dry, mostly breaking into 4 (or due to abortion fewer) nutlets, or sometimes fleshy with 4 pyrenes (in the Simen *Clerodendrum* only).

1 Plant distinctly woody (shrub or ± climbing shrub); fruits fleshy, with 4 pyrenes ..... 2 (*Clerodendrum*)
Plant herbaceous, less often subshrubby or shrubby; fruits dry, with 4 nutlets 3

2 Corolla ± regular, with cylindrical tube to ca. 7 cm long, white ..... *Clerodendrum rotundifolium*
Corolla irregular, tube very short, at least lower lobe (dark) blue ..... *Clerodendrum myricoides*

3 Small annual herb with pinnatifid leaves on the lower stem parts ..... *Aeolanthus pinnatifidus*
Not as above; leaves never pinnatifid 4

4 Flowers unilabiate (upper lip much reduced; lower lip large) ..... *Ajuga bracteosa* var. *canescens*
Flowers 2-lipped 5

5 At least upper lip of flower densely hairy; margins sometimes bearded 6
Upper lip of flower neither densely hairy nor bearded 10

6 Corolla purple, pubescent on the outside; leaves to ca. 1 cm long ..... *Stachys hypoleuca*
Corolla orange or white; leaves much larger 7

7 Corolla appearing orange due to dense cover of orange hairs ..... *Leonotis ocimifolia* var. *raineriana*
Corolla white; upper lip densely covered by white to cream hairs above and along margins, or margins white-breaded 8

8 Corolla ca. 1.5 cm long; calyx tubular to subcampanulate, with 5 small, equal, subulate lobes ..... *Leucas stachydiformis*
Corolla ca. 1.5-3 cm long; calyx strongly dilated to form a flat or widely funnel-shaped limb 9

9 Leaves narrowly lanceolate, margins almost entire or shallowly serrate ..... *Otostegia tomentosa* subsp. *steudneri*
Leaves ovate, rhomboid or orbicular, margins crenate ..... *Otostegia fruticosa*

10 Fertile stamens 2 11
Fertile stamens 4 12

11 Leaves to ca. 20 cm long; corolla to 4 cm long, whitish with the lips flushed with blue or lilac; fruiting calyx to 2 cm long ..... *Salvia schimperi*
Leaves to ca. 10 cm long; corolla to ca. 1 cm long, bluish violet, purple or white; fruiting calyx to 1 cm long ..... *Salvia merjamie*

12 Stamens long exserted, longer than the corolla 13
Stamens shorter than corolla (if exserted from corolla tube then not longer than upper lip) 15

Fig. D79. – A-B, Lippia adoensis *var.* adoensis, *A, habit, B, detail of flower cluster.*

13 Shrub to > 1 m tall with leaves to 7 cm long ..... *Becium grandiflorum*
Aromatic perennial herb with woody base; leaves to 1.5 cm long 14

14 Leaves ovate to lanceolate, margins entire ..... *Thymus schimperi*
Leaves oblanceolate to obovate, margins crenate in the upper third to half ..... *Thymus serrulatus*

15 Fruiting calyx with subulate-spiny lobes; inflorescences dense head-like in flower but elongating in fruiting stage ..... *Pycnostachys abyssinica*
Calyx never with spiny lobes 16

16 Lower lip of the corolla distinctly lobed (but with an entire margin); 2 posterior stamens shorter than the 2 anterior ..... 17 (*Satureja*)
Lower lip of the corolla ± unlobed and entire, with or without dentate margin 21

17 Leaf margins crenate 18
Leaf margins entire 19

18 Calyx gibbous, with curved tube ..... *Satureja simensis*
Calyx tubular, straight ..... *Satureja abyssinica*

19 Leaves linear(-lanceolate), white tomentose ..... *Satureja unguentaria*
Leaves orbicular, ovate or narrow lanceolate, mostly glabrous 20

20 Leaves 2-4 mm long; cymes 1-2-flowered ..... *Satureja imbricata*
Leaves 4-13 mm long; cymes more-flowered ..... *Satureja punctata*

21 Lower lip of the corolla subentire with a dentate margin ..... *Nepeta azurea*
Corolla with an entire, distinctly boat-shaped (deeply concave) lower lip, larger than upper lip ..... 22 (*Plectranthus*)

22 Robust perennial herb to 3 m tall; inflorescence very extensive, panicle-like; flowers on pedicels to ca. 2 cm long ..... *Plectranthus garckeanus*
Plants smaller, less robust; inflorescences spike-like; flowers shortly pedicellate 23

23 Inflorescence forming a terminal dense many-flowered cylinder ca. 1.5 cm in diam. and up to 10 cm long ..... *Plectranthus ornatus*
Inflorescence open and verticillate 24

24 Corolla < 1 cm long, tube not sharply bent ..... *Plectranthus punctatus*
Corolla 1-2 cm long, tube sharply bent 25

25 Leaves ± sessile, lanceolate to elliptic-lanceolate; plants frequently producing edible potato-like tubers; stems hirsute and glandular ..... *Plectranthus edulis*
Leaves long-petiolate, ovate to lanceolate; plants sometimes producing small tubers; stems sparsely hairy ..... *Plectranthus lanuginosus*

Clerodendrum myricoides (Hochst.) Vatke
Shrub to c. 2.5 m tall, with glabrous to pubescent branches. Leaves mostly in whorls of 3, ovate-elliptic to oblong, to ca. 10 cm long, finely pubescent and glandular-punctate below, margins dentate. Flowers in few-flowered cymes forming a terminal panicle; sepals rounded, obtuse, erect, reddish; corolla tube very short, the 2 pairs of upper lobes white to pale blue, ca. 1 cm long, the lower lobe larger, more intensively blue to dark blue; long-filamented stamens and style with stigma curved, positioned opposite (above) the lower lobe. Fruit drupaceous, almost black, mostly deeply 4-lobed.
LL. Scrub, secondary forest. Common. Flowers in the wet season.

Clerodendrum rotundifolium (Hochst.) A.Rich.
Shrub or ± climbing shrub to ca. 2.5 m tall, with densely pubescent twigs. Leaves opposite or in whorls of 3, long-petiolate, ovate to suborbicular, to 15 cm long, base rounded to cordate, pubescent, margin ± entire to crenate. Flowers in long-stalked, lax, few-flowered terminal cymes; sepals ovate-lanceolate, to ca. 1 cm long; corolla white, with slender cylindrical tube to ca. 7 cm long, lobes obovate, ca. 1 cm long; stamens and style with stigma exserted for ca. 2 cm or more. Fruit drupaceous, black when fully mature, 4-lobed.
LL. Dry woodland. Rare. Flowers in the dry season.
Note. Only recorded from the Jinbar valley, below 2,000 m.

Ajuga bracteosa Wall. ex Benth. var. **canescens** (Benth.) Engl. (syn. *A. remota* Wall. ex Benth. var. *canescens* Benth., *A. crenata* Hochst. ex Chiov.]
Decumbent perennial herb, stems rooting at the nodes; young stems and leaves ± densely canescent. Leaves subsessile or shortly stalked, oblanceolate or narrowly obovate, to 10 cm long. Flower in clusters of 3-10 in axils of leaf-like bracts; corolla to ca. 1 cm long, 1-lipped (upper lip much reduced; lower lip large, 3-lobed with the mid-lobe broader than the lateral lobes and deeply emarginated), pale violet or light blue to whitish. Fruiting calyx subequally 5-lobed, widely cupular, often slightly constricted at the mouth. Nutlets strongly reticulate, ca. 2 mm long.
LL, **UL**. Steep rocky, open or shaded grassland,. Uncommon. Flowers in the wet season.

Stachys hypoleuca Hochst. ex A.Rich.
Perennial herb, woody at the base; young branches ± terete, white-tomentose, older parts glabrescent. Leaves (sub)sessile, lanceolate, to ca. 1 cm long, white tomentose below. Inflorescence crowded, 6-8-flowered verticillasters in the axils of leaf-like bracts; flowers shortly pedicellate; calyx tomentose; corolla 2-lipped, purple (?), pubescent on the outside. Nutlets brown, obovate, ca. 2 mm long.
UL. Grassland. Rare. Flowering season unknown.
Note. Endemic to Ethiopia; only known from Gondar Floristic Region and neighboring Tigre Uplands.

Otostegia tomentosa A.Rich. subsp. **steudneri** (Schweinf.) Sebald
Shrub or subshrub up to 3 m tall. Leaves shortly petiolate, narrowly lanceolate, often > 3 cm to ca. 12 cm long, margins almost entire or shallowly serrate. Inflorescence with up to 12 verticillasters of 2-12-flowered cymes; bracteoles shorter than the calyx tube. Calyx limb widely funnel-shaped with very short or obsolete, obtuse-angled to rounded or shortly apiculate teeth, the abaxial side more expanded than the adaxial side and often forming an obtusely quadrangular, 3-ribbed lobe. Corolla white, ca. 2-3 cm long, 2-lipped, upper lip hooded, densely hairy and marginally bearded. Nutlets obovoid, ca. 2.5-3 mm long, smooth.
UL. *Erica*(-*Hypericum*) scrub and bushland. Locally common. Flowers in the dry season.
Note. Subsp. *steudneri* is endemic to Ethiopia, only occurring in the Simen and the Wollo Uplands. Subsp. *tomentosa*, also endemic to Ethiopia, has shorter, wider leaves. A third

Fig. D80. – A-D, Clerodendrum *spp.; A-B,* C. myricoides, *A, flowering branch, B, inflorescence and flowers; C-D,* C. rotundifolium, *C, habit, D, inflorescence and flowers. – E-F,* Ajuga bracteosa *var. canescens, E, habit, F, flowers. – G,* Otostegia tomentosa *subsp.* steudneri, *inflorescence and flowers.*

subspecies, subsp. *ambigens*, has distinctly serrate-dentate leaf margins and longer petioles; it is more widely distributed than the other two subspecies.

Otostegia fruticosa (Forssk.) Schweinf. ex Penzig subsp. **fruticosa**
Shrub up to 3 m tall. Leaves closely spaced, petiolate, ovate, rhomboid or orbicular, to 15 cm long, ± pubescent, margins crenate. Inflorescence with several verticillasters of up to 30-flowered cymes; bracteoles more than half as long as the calyx tube. Calyx limb flat to funnel-shaped, ± regular to ± 2-lipped with unequal lips, on the adaxial side expanded to form a triangular to ovate, longer than wide tooth. Corolla white, ca. 1.5-3 cm long, 2-lipped, upper lip hooded, densely hairy and marginally bearded. Nutlets obovoid, 2-3 mm long.

LL. Montane bushland on rocky slopes; heavily grazed areas. Uncommon. Flowers in the dry season.

Note. Subsp. *schimperi*, distinguished by shorter, more widely spaced leaves, occurs only at low altitudes (< 1,000 m) and grows in very arid vegetation.

Leucas stachydiformis (Hochst. ex Benth.) Briq.
Perennial herb or subshrub up to 3 m tall. Leaves petiolate, lanceolate to ovate, to 10 cm long, greyish-white tomentose-pubescent below, margins serrate-crenate. Inflorescence to 40 cm long, with up to 12 verticillasters of 10-25-flowered cymes; bracts ± leaf-like, bracteoles linear, up to as long as the calyx. Calyx tubular to subcampanulate, ca. 1 cm long, with 5 small, equal, subulate lobes. Corolla white, ca. 1.5 cm long, 2-lipped, upper lip hooded, densely covered with white or cream hairs above and along margins, lower lip 3-lobed, as long as or slightly shorter than the upper lip. Style with slightly unequal stigma lobes. Nutlets oblong, ca. 2 mm long, glabrous.

LL. Montane bush- or woodland; edge of afromontane forest. Locally common. Flowers in the wet season.

Note. Endemic to Ethiopia.

Leonotis ocymifolia (Burm.f.) Iwarsson var. **raineriana** (Visiani) Iwarsson
Shrubby herb to ca. 2 m tall, often with a solitary, erect stem. Leaves petiolate, ovate, to ca. 15 cm long, densely silvery or yellowish velvety especially on the lower surface, margins crenate with numerous teeth. Flowers many in large and dense spherical verticillasters, to > 5 cm in diam.; calyx tubular, to 3 cm long, recurved, 8-10 toothed, pubescent to velvety; corolla to ca. 4 cm long, 2-lipped, densely covered by orange hairs, upper lip hooded, almost as long as the tube, lower lip 3-lobed. Nutlets blackish brown, to 4 mm long.

LL, **UL**. Rocky outcrops in grassland; forest margins; disturbed areas. Locally common. Flowers in the dry season.

Note. Var. *raineriana* is widely distributed, occurring as far South as South Africa; var. *ocymifolia* has a similar distribution range but reaches its northern limit in Kenya.

Nepeta azurea R.Br. ex Benth.
Woody perennial herb, up to > 1 m tall, ± pubescent with short greyish hairs. Leaves subsessile to shortly petiolate, lanceolate, narrowly ovate to ovate, mostly densely greyish-whitish pubescent below, base auriculate-cordate cordate or subcordate, margins crenate or sometimes serrate. Inflorescence thyrsoid, made up of 5- to many-flowered shortly stalked cymes. Calyx slightly recurved, ± unequally 5-lobed, < 1 cm long, usually densely hairy. Corolla bluish, purplish or white, to ca. 1 cm long, ± recurved, 2-lipped, upper lip 2-lobed to emarginate, slightly hooded or flat, lower lip oblate, concave, denticulate. Nutlets ca. 2 mm long, brown, tuberculate above.

UL. Shady and damp places along watercourses; seepage areas in grassland. Uncommon. Flowers in the dry season.

Thymus schimperi Ronniger subsp. **schimperi**
Aromatic perennial herb with woody base; stems to ca. 40 cm long, prostrate or ascending above, 4-angled, young parts pubescent to tomentose. Leaves mostly sessile, ovate to lanceolate, to 1.5 cm long, glandular on both surfaces, margins entire. Inflorescence made

Fig. D81. – A-B, Otostegia fruticosa, *A, habit, B, inflorescence and flowers. – C-D,* Leonotis ocymifolia *var. raineriana, D, habit, E, inflorescences and flowers. – E,* Thymus schimperi, *flowering individual.*

up of 2-8-flowered verticillasters arranged in compact, globose to oblong heads; bracts similar to foliage leaves. Calyx gland-dotted, pubescent, tube campanulate, 2-lipped, upper lip with 3 minute lobes, lower lip with slightly larger 2 lobes. Corolla white to purple, 6-8 mm long, 2-lipped; upper lip unlobed, lower lip 3-lobed, the middle lobe slightly larger than lateral lobes. Stamens and style exserted.

UL. Open grassland, often in rocky areas. Uncommon. Flowers in the dry season.

Note. The species is endemic to Ethiopia; subsp. *schimperi* is widespread in the highlands while subsp. *hedbergianus*, with elliptic-lanceolate leaves and lax inflorescences, is confined the Harerge Floristic Region.

Thymus serrulatus Benth.
Aromatic perennial herb with woody base; stems to 30 cm long, branched, prostrate to decumbent, often ± erect above, young parts pubescent. Leaves (sub)sessile, oblanceolate to obovate, to ca. 1.5 cm long, glandular on both sides, margins crenate in the upper third to half. Inflorescence made up of 2-8-flowered verticillasters arranged in compact, globose to oblong heads; bracts similar to foliage leaves. Calyx glandular, 2-lipped, upper lip with 3 minute lobes, lower lip with slightly larger 2 lobes. Corolla white to purple, 7-8 mm long; 2-lipped; upper lip unlobed, lower lip 3-lobed, the middle lobe larger than lateral lobes. Stamens and style exserted.
UL. Afroalpine grassland, often around rocks; rocky outcrops. Common. Flowers in the wet and dry season.
Note. Endemic to the northern highlands of Ethiopia.

Satureja simensis (Benth.) Briq.
Subshrub with prostrate, ascending to erect up to 40 cm long stems und runner-like branches. Leaves petiolate, (broadly) ovate, to ca. 10 mm long, margins with 4-6 crenations. Inflorescence made up of 1-10-flowered cymes; bracts leaf-like. Calyx gibbous, with curved tube, upper lobes triangular, lower ones subulate. Corolla white, rose or lilac, to ca. 10 mm long; 2-lipped, upper lip bifid, lower lip with trifid middle lobe and 2 side lobes. Stamens 2 fertile + 2 staminodes, shorter than the corolla. Nutlets ellipsoidal, 1 mm long.
UL. Damp to moist areas in grassland. Uncommon. Flowers in the wet season.

Satureja abyssinica (Benth.) Briq. subsp. **abyssinica**
Annual or perennial herb with strong lemon-mint smell; stems to 80 cm long, erect, branched in the middle, very shortly hairy. Leaves in lower stem parts petiolate, sessile high up, thin, ovate to rhombic, margins with few crenations. Inflorescence lax, made up of well separated verticillasters of several distinctly pedicellate flowers. Calyx tubular, straight, with small subequal lobes. Corolla pink, 7-9 mm long; 2-lipped, upper lip short, bifid, lower lip with 3 lobes, the middle lobe longer than the 2 side lobed. Stamens 4. Both stamens and style enclosed in corolla tube. Nutlets ellipsoid-trigonous, 1 mm long.
LL. Shrub- or woodland; rocky grassland on steep slopes. Uncommon. Flowers in the wet season.
Note. Subsp. *condensata* differs in having sessile flowers arranged in dense clusters.

Satureja imbricata (Forssk.) Briq.
Subshrub with prostrate to ascending branched stems to 20 cm long. Leaves shortly petiolate, ovate, < 5 mm long, margins entire, revolute. Inflorescence with 1-2-flowered cymes. Calyx weakly gibbous, with subulate lobes, the 2 lower longer than and overtopping the 3 upper. Corolla red or white, to ca. 1 cm long. Stamens 4.
UL. Rocky slopes; grassland. Rare. Flowers in the wet season.

Satureja punctata (Benth.) Briq. subsp. **punctata**
Subshrub or small shrub; stems to 1 m long, often with long unbranched branches. Leaves sessile or shortly petiolate, orbicular to ovate or narrow lanceolate, 4-13 mm long, ± glabrous, often leathery, margins revolute, entire. Inflorescence with many verticillasters; cymes mostly many-flowered, pedunculate. Calyx with nearly equal small lobes. Corolla red, violet or white, < 1 cm long; 2-lipped, upper lip slightly emarginate, lower lip with bifid middle lobe and 2 side lobes. Stamens 4, the 2 longer shorter than the upper lip. Nutlets ellipsoid-trigonous, 1 mm long.
UL. Rocky outcrops in Afroalpine grassland, cracks of rocks. Common. Flowers in the dry season.
Note. Subsp. *ovata*, only known from Ethiopia and Djibouti, is distinguished by having many bristly hairs on the lower leaf surface.

Fig. D82. – A-B, Thymus serrulatus, *A, flowering individual, B, detail. – C-E,* Satureja *spp., flowering individuals; C,* S. simensis*; D,* S. abyssinica*; E,* S. imbricate.

Satureja unguentaria (Schweinf.) Cufod.

Subshrub with tomentose, densely leafy stems to 0.5 m long. Leaves shortly petiolate, linear(-lanceolate), to 18 mm long, white tomentose, margins entire. Inflorescence with several shortly pedunculate cymes. Calyx with small, straight lobes. Corolla red to violet, 15 mm long; 2-lipped, upper lip short, bifid, lower lip with 3 lobes. Stamens 4, the 2 longer as long as the upper lip and exserted from the tube. Fruits unknown.

UL. Mountain slopes. Rare. Flowering season unknown.

Note. Endemic to the Simen.

Salvia schimperi Benth.
Perennial herb with a woody rootstock, to ca. 1 m tall, strongly fragrant. Leaves petiolate near stem base, sessile higher up, ovate to ± elliptic, to ca. 20 cm long, densely pubescent below, margins irregularly crenate. Inflorescence with 1-3-flowered cymes; bracts (broadly) ovate, distinctly smaller than the leaves, white with green margins. Calyx to 2 cm when in fruit, ± distinctly 2-lipped, upper lip minutely 3-fid, lower lip 2-lobed. Corolla to 4 cm long, whitish with the lips flushed with blue or lilac; upper lip hooded, lower lip 3-lobed, with large and orbicular middle lobe. Stamens 2 fertile + 2 staminodes. Style with unequally 2-lobed stigma. Nutlets ± globose, ca. 3 mm long, mucilaginous on wetting.
LL, UL. Grassland; open places in woodland; heavily grazed areas; rocky places. Common. Flowers in the dry season.

Salvia merjamie Forssk.
Perennial herb to ca. 0,5 m tall, with a woody root and a basal leaf rosette. Leaves petiolate (rosette leaves) to ± sessile (stem leaves), oblong, elliptic or ovate, to ca. 10 cm long, margins irregularly crenate to pinnately lobed. Inflorescence with mostly 3-flowered cymes; bracts ovate, distinctly smaller than the leaves. Calyx to 1 cm when in fruit, ± distinctly 2-lipped, upper lip subacute in outline and minutely lobed near apex, lower lip 2-lobed. Corolla to ca. 1 cm long, bluish violet, purple or white; upper lip hooded, lower lip 3-lobed, with saccate middle lobe. Stamens 2 fertile + 2 staminodes. Style with unequally 2-lobed stigma. Nutlets ca. 2 mm long, often minutely tuberculate, mucilaginous on wetting.
LL, **UL**. Grassland. Common. Flowers in the wet season.

Becium grandiflorum (Lam.) Pic-Serm.
Shrub to > 1 m tall. Leaves petiolate, lanceolate, ovate or elliptic, to 7 cm long, subglabrous to pubescent, often sticky, margins serrate to subentire. Inflorescence with up to 16 verticillasters, short and dense at first, elongating in fruiting stage; bracts present only before the anthesis. Calyx tube campanulate, lateral lobes obsolete. Corolla pale lilac to pink, 1.5-2.5 cm long, 2-lipped, upper lip 4-lobed, lower lip entire; stamens long exserted from corolla tube. Nutlets ca. 3 mm long, enclosed in slightly enlarged calyx.
LL. Rocky areas in bushland or scrub. Common. Flowers in the wet season.
Note. Endemic to Ethiopia.

Aeolanthus pinnatifidus Hochst. ex Benth. in A.DC.
Annual herb with thin roots. Leaves subsessile, lower ones pinnatifid, upper ones dentate. Inflorescences lax, raceme-like, bracts distinctly smaller than the leaves; corolla purple or violet, 2-lipped, upper lip 4-lobed, lower lip boat-shaped, corolla tube < 1 cm long; calyx 5-lobed at anthesis, becoming distinctly 2-lipped after anthesis, circumscissile in the fruiting stage (apical part deciduous and basal, cupular part persistent). Nutlets ca. 1 mm long, dark brown, minutely tuberculate, mucilaginous on wetting.
LL. In shallow soil on rock sheets. Rare. Flowers in the wet season.
Note. Endemic to Ethiopia. Perhaps not distinct from the closely related *A. abyssincus* (plants perennial; leaves only faintly crenate).

Plectranthus ornatus Codd
Unpleasant-smelling, coarse pubescent succulent herb up to 1 m tall; stems decumbent, woody at the base. Leaves obovate, up to 5 cm long, base cuneate into a short pseudo-petiole, thick and fleshy, margins shallowly serrate-crenate. Inflorescence forming a terminal dense many-flowered cylinder ca. 1.5 cm in diam. and up to 10 cm long; bracts large, ovate and coloured, persisting until the flowers open. Calyx zygomorphic, hairy and glandular on the outside, bearded at the throat, short-tubed, with a broadly triangular upper lip; lower calyx teeth somewhat shorter than the lip. Corolla blue to rich purple-blue, to 2 cm long, tube only slightly bent and slightly broadened at the mouth, 2-lipped; upper lip with 2 small round

Fig. D83. – A-B, Salvia *spp.; A-B,* S. schimperi, *A, habit, B, flowers; C-D,* S. merjamie, *C, inflorescence and flowers, D, detail. – E-F,* Aeolanthus pinnatifidus, *E, habit, F, detail.*

lobes at the base, the main lip erect to recurved and about ¼ as long as the narrowly lanceolate concave lower lip. Stamens 4, filaments fused for over ¼ their length, enclosed in the lip. Nutlets small, ± orbicular, glabrous.

LL. Rocky areas, grassland. Common. Flowers throughout the year.

Plectranthus punctatus (L.f.) L'Hér.
Perennial herb to 75 cm tall; stems branched, woolly with long purple-septate hairs. Leaves shortly petiolate to sessile, ovate to ovate-elliptic, to 5 cm long, margins shallowly and rather finely crenate-dentate. Inflorescences villose, terminal and axillary, dense and spicate when in flower, elongated to 10 cm and interrupted in fruit; cymes sessile, flowers very shortly pedicellate. Calyx ca. 5 mm long, tube short, campanulate; upper lip ovate, up-curved, equalling the tube; calyx teeth lanceolate, acuminate about equalling the lip. Corolla blue, usually < 1 cm long, tube funnel-shaped, not sharply bent, 2-lipped; upper lip well developed, flat, broadly obovate, crenate and pubescent, lower lip concave, pubescent. Stamens 4, filaments free or slightly fused at the base, enclosed in lower lip. Nutlets small, ± elliptic, glabrous.

LL. In open areas along trails, by streams and at forest edges; weedy. Common. Flowers throughout the year.

Plectranthus edulis (Vatke) Agnew
Aromatic perennial herb to ca. 1 m tall, frequently producing edible underground potato-like tubers on slender rhizomes; stems erect, hirsute and glandular; lower branches decumbent and rooting at the base. Leaves ± sessile, lanceolate to elliptic-lanceolate, up to 12 cm long, margins dentate. Inflorescence terminal, spike-like, 10-20 cm long, soon becoming elongated and interrupted; axes glandular-pubescent with long purplish septate hairs; cymes sessile, flowers very shortly pedicellate. Calyx 7-8 mm long, villose and gland-dotted; upper lip ovate, apiculate and slightly upcurved, equalling the tube; calyx teeth lanceolate, acuminate, about equalling the lip. Corolla rich purple-blue with small dark spots, ca. 1-2 cm long, tube bent and funnel-shaped with a bulge on the upper surface, 2-lipped; upper lip erect to recurved, broadened above, 2-lobed, lower lip large and deeply concave, bearded and gland-dotted. Stamens 4, filaments fused for ca. ¼ their length, included in the lip. Nutlets small, ± elliptic, glabrous.

LL. Damp to wet and marshy places. Uncommon. Flowers in the wet season.

Note. Very close to the previous (*P. punctatus*) and sometimes not clearly distinguishable.

Plectranthus lanuginosus (Hochst. ex Benth.) Agnew
Aromatic perennial herb to ca. 2 m tall, erect or decumbent at base, sometimes producing small tubers. Leaves very variable, long-petiolate, ovate to lanceolate, up to 15 cm long, thick and ± fleshy, margins crenate. Inflorescences terminal, pseudo-racemose, dense when young, elongating and interrupted in fruit, villose with purple-septate hairs; cymes sessile, flowers very shortly pedicellate. Calyx 5-8 mm long, purple, sparsely to densely villose with long septate hairs, tube short and curved; upper lip ovate and upcurved; calyx teeth lanceolate, all equal and ± as long as the lip. Corolla rich purple blue, ca. 1-1.5 cm long, tube sharply bent and funnel-shaped, 2-lipped; upper lip small and recurved, lower large and deeply concave, pubescent with long septate hairs. Stamens 4, filaments fused for ca. ¼ their length, included in the lip. Nutlets small, ± elliptic, glabrous.

LL. Rocky areas in grassland, scrub or woodland. Uncommon. Flowers in the wet season.

Plectranthus garckeanus (Vatke) J.K.Morton
Robust aromatic perennial herb to 3 m tall; stems woody at the base, shortly glandular-pubescent, branched. Leaves petiolate, lanceolate, up to 15 cm long, thinly and shortly pubescent, margins dentate. Inflorescence very extensive, panicle-like; cymes well-spaced, sessile, with flowers on glandular-pubescent pedicels to ca. 2 cm long. Calyx ca. 1-1.5 cm long, tube as long as the teeth; upper lip broadly lanceolate, upcurved and convex; calyx teeth lanceolate, all similar, as long as the lip. Corolla rich blue, 1.5 - 2.5 cm long, tube sharply bent, funnel-shaped; 2-lipped; upper lip erect, flat and shallowly lobed, lower lip large and deeply concave. Stamens 4, filaments free, included in the lip.

LL. Montane forest edges and openings. Locally common. Flowers in the wet season.

Fig. D84. – A-B. Plectranthus *spp.: A-B,* P. punctatus, *A, habit, B, detail; C,* P. edulis, *inflorescence and flowers; D-E, P. garckeanus, D, habit, E, inflorescence with pedicellate flowers.*

Pycnostachys abyssinica Fresen.

Robust perennial herb or subshrub 1 m or more tall, with densely pubescent stems and leaves. Leaves petiolate, broadly ovate, to 20 x 15 cm, margins crenate. Inflorescence raceme-like, dense, congested and head-like at first but elongating to ca. 20 cm in fruiting stage. Calyx ± zygomorphic, subequally 5-lobed; lobes subulate, becoming rigid and spinescent in fruiting stage. Corolla blue or violet, ca. 1.5-2 cm long, 2-lipped, upper lip 4-lobed, lower lip boat-shaped, much longer than upper lip. Nutlets ca. 2.5 mm long, black, glossy.

LL. Forest margins. Common. Flowers in the wet season.

MONOCOTS

Characterized by having only one seed-leaf or cotyledon. Monocots are mostly herbs; tree-like representatives are uncommon. They never have hard wood and secondary growth is very rare. Single long tap roots are absent but underground storage organs are quite common. The leaves are usually alternate along the stem and often simple with the secondary veins ± parallel to the mid vein; a distinct leaf-stalk is usually absent and the base of the leaf often clasps the stem. The flowers typically have their parts arranged in whorls of 3 ("3-merous"). Sepals and petals are usually alike in form and color (called tepals) and together are typically 6 in number. The ovaries usually have 3 locules, and the stigmas are 3 in number.

ARACEAE (181)
Herbs with tubers or rhizomes. Leaves simple or divided palmately, pedately or pinnately. Inflorescence a spadix (a spike of flowers with a fleshy axis, enclosed in a spathe, i. e., a large bract), either monoecious (female flowers below and male flowers above on a spadix) or dioecious (male and female flowers on separate plants). Flowers with or without a perianth. Stamens usually 6, united. Ovary 1–3-chambered. Fruit usually a berry.

Arisaema schimperianum Schott
Herb to ca 1.5 m. Leaves with up to 15 radiating, elliptic leaflets, margins serrate-dentate with teeth ending in a bristle. Spathe green with white to ± yellowish stripes, 8–31 cm long, its tubular part 3–12 cm long, not constricted at the top.
LL, (UL). Between rocks, wet places. Uncommon. Flowers in the wet season.

Arisaema enneaphyllum Hochst. ex A.Rich.
Similar to the above, but leaflets only 5–10, leaflet-margins irregularly serrate to ± entire, and tubular part of spathe often shorter and slightly constricted at the top.
LL. Between rocks, wet places, stream banks. Uncommon. Flowers in the wet season.
Note. Both this and the previous species can occur in the same locality.

DIOSCOREACEAE (183)
Twining, climbing herbs with tubers. Leaves simple, rarely digitately compound. Flowers in spikes, racemes or panicles, uni- or bisexual. Perianth segments 6, usually fused at the base. Stamens 3 + 3, the inner whorl sometimes sterile. Ovary inferior, rarely superior, 3-chambered. Fruit a capsule, rarely a berry. Seeds usually winged.

Dioscorea quartiniana A.Rich.
Unarmed herb with stems twining to the left. Leaves alternate, compound, with 3–5 leaflets. Inflorescence a dense, hanging spike of unisexual flowers. Perianth and ovary hairy in female flowers. Fruits 3-winged, oblong-elliptic, ca. 2–3.5 cm long. Seeds winged on basal side only.
LL. Edge of scrub and thicket. Rare. Flowers in the wet season.

ASPARAGACEAE (186A)
Perennial, climbing or erect shrubs with rhizomes; branches green, photosynthetic. Leaves scale-like. Inflorescences axillary or terminal. Flowers regular, uni- or bisexual. Perianth 3 + 3, united. Stamens 3 + 3, non-functional in female flowers. Ovary superior, 3-chambered. Fruit a globose berry with 1–2(-3) black seeds.

Asparagus africanus Lam.
Climbing, scrambling or suberect shrub to 5 m, spiny below. Flowers pedicellate, 5–20 together, axillary and terminal; tepals white, ca. 5 mm long. Stamens shorter than perianth, with yellow anthers. Style 3-branched. Berry orange-red, ca. 5 mm in diam., 1-seeded.
LL, UL. Edge of montane forest, at high altitudes also in *Hypericum revolutum* stands. Rather common. Flowers in the wet season.

DRACAENACEAE (187)
Trees, or sometimes xerophytic herbs with rhizomes. Leaves leathery to succulent, mostly in terminal rosettes. Inflorescences axillary. Flowers regular. Perianth segments 6, fused at the base into a short tube. Stamens 6, inserted at throat of perianth, filaments often somewhat inflated. Ovary superior, 3-chambered. Fruits a 1–3-seeded berry.

Fig. M1. – A-D. Arisaema *spp.: A-B.* A. schimperianum, *A. with fruiting inflorescences, B spathes cut open to show male (left two) and female inflorescences (right two; young fruits on the far right); C-D.* A. enneaphyllum, *D. detail of spathe. – E.* Dioscorea quartiniana, *old fruiting inflorescences with open capsules, winged seeds on the left. – F-G.* Asparagus africanus; *F. habit, G. flowers and fruit.*

A
B
C
D
E
F
G

Dracaena steudneri Engl.
Tree to 10 m. Leaves leathery, with smooth margin, to ca. 80 cm long. Panicles many-flowered, bending downward in fruit. Perianth greenish-white. Fruit orange-coloured at first, later dark purple to blackish. Seeds white.

LL. Afromontane forest remnants, secondary forest; apparently planted around churches. Uncommon. Flowers in the wet season.

HYPOXIDACEAE (189)

Perennial herbs with a vertical tuberous rhizome. Leaves basal, usually arranged in 3 ranks and hairy. Flowers regular, borne on an axillary, leafless, usually hairy stalk. Perianth segments 3 + 3, showy, yellow or white, often green-backed, persistent, hairy on the outer surface. Stamens 6, arising from the perianth; filaments short. Ovary inferior. Fruit a capsule, crowned by the remains of the perianth. Seeds black.

Curculigo pilosa (Schum. & Thonn.) Engl.
Herb with cylindrical, vertical rhizome. Leaves folded longitudinally, slightly hairy. Flowers yellow, solitary, sessile; ovary enclosed by scale leaves. Fruit indehiscent, fleshy. Seeds with conspicuous hooked appendage.

LL. Grassland and rocky areas. Rare. Flowers at the beginning of the wet season, soon after burning.

Note. New record for the Gondar Floristic Region and the Simen.

ANTHERICACEAE (190)

Perennial herbs with rhizomes. Roots sometimes swollen or with distinct tubers. Leaves in basal rosettes. Inflorescences paniculate, racemose or spicate. Flowers regular, or sometimes slightly irregular. Perianth 3 + 3, free. Stamens 3 + 3, free. Ovary superior, 3-chambered. Fruit a capsule. Seeds glossy black, without aril.

Anthericum sp. ? [see Note]
Herb to 5 cm, with very reduced rhizome and swollen, but not tuber-like roots. Leaves linear, 5–10 cm long. Flowers emerging directly from the leaf rosette, few or only 1 per plant. Perianth with star-like appearance, yellow, 8–12 mm long. Capsules ± globose.

UL. Seasonally waterlogged grassland at 4,000 m and above. Very rare. Flowers at the beginning of the wet season.

Note. The true identity of this plant remains unknown; it is likely to be a new taxon. Using FEE, it keys out to Anthericaceae and *Anthericum*. The latter, however, is characterized by having white tepals tinged green or with green stripes, but not a yellow perianth.

Chlorophytum tetraphyllum (L.f.) Baker
Low, ± prostrate herb with swollen roots and often also with elongated tubers. Leaves in rosettes, narrowly lanceolate, to 25 cm long. Inflorescences condensed, appearing between the leaves, umbel-like. Flowers white, tepals spreading to reflexed, < 1 cm long. Stamens shorter than perianth, anthers bright orange. Capsules slightly triangular. Seeds saucer-shaped.

LL. Grassy forest edge. Rare. Flowers in the wet season.

ASPHODELACEAE (191)

Perennial herbs with thick rhizomes. Roots sometimes swollen but without distinct tubers. Leaves in basal rosettes. Inflorescences simple, rarely branched. Flowers regular. Perianth free or fused. Stamens 6, free or slightly fused with perianth. Ovary superior, 3-chambered. Fruit a capsule. Seeds enclosed in aril, dull brown or black, sometimes glutinose.

Fig. M2. – A, Dracaena steudneri, *habit – B,* Cuculigo pilosa, *plants coming into flower after fire. – C-D,* Anthericum *sp. ?, C, habit, D, dug out plant.*

A
B
C
D

Kniphofia pumila (Ait.) Kunth
Slender solitary herb. Inflorescences dense (usually 15 flowers per cm), 4–15 cm (up to 18 cm in fruit) long. Flowers opening from top downwards. Perianth campanulate, 9–14 mm long (14–18 mm in cultivation), wider at the mouth, slightly constricted at the base, white or pale orange. Stamens and styles exserted for 10—15 mm at anthesis.

LL. Steep shady slopes above streams. Uncommon. Flowers in the wet season.

Note. Endemic to Ethiopia.

Kniphofia foliosa Hochst.
Robust herb forming dense clumps, with erect rhizome. Stems often distinct, up to 40 cm long. Inflorescences dense, 15–40 cm (up to 50 cm in fruit) long. Flowers opening from base upwards. Perianth funnel-shaped, 18–27 mm long, yellow to orange or red (in bud). Stamens and style exserted for 8–15 mm at anthesis.

UL, ESC. Steep slopes, rocky outcrops; in disturbed, heavily overgrazed grassland. Common. Flowers in the wet season.

Note. Endemic to Ethiopia.

Kniphofia isoetifolia Steud. ex Hochst.
A slender herb, usually solitary, but sometimes in groups of 5–6 stems. Inflorescences lax or ± dense, capitate, 4–8(-12) cm long. Flowers opening from top downwards. Perianth cylindrical, 30–42 mm long, red, (uncommonly) yellow in the same population. Stamens and style barely exserted at anthesis.

UL. Edge of cultivated fields, overgrazed grassland. Generally not too common. Flowers in the wet season.

Note. Endemic to Ethiopia.

Kniphofia schimperi Baker
Slender herb. Inflorescences distinctly lax, usually 1–3(-4) flowers per cm, secund (flowers bending to one side), 15–35(-52) cm long. Flowers opening from base upwards. Perianth cylindrical, 15–25 mm long, widening at the mouth and not consricted at the base, pale-red to orange. Stamens and style barely exserted at anthesis.

UL. Rocky grassland. Uncommon. Flowers in the wet season.

Note. Endemic to Ethiopia.

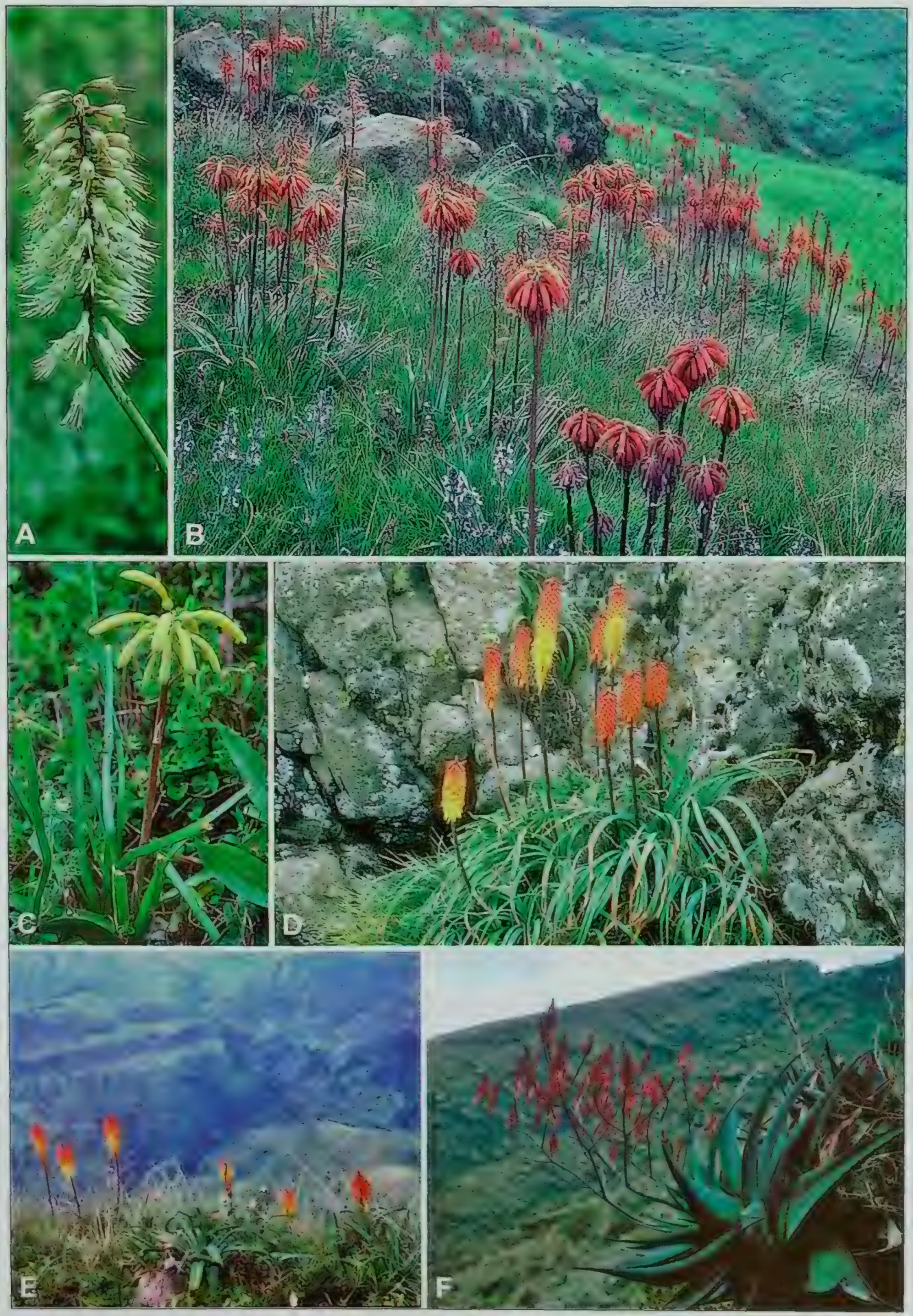
ALOACEAE (192)
Succulent perennial herbs to ± large, woody trees. Leaves usually spirally arranged (rarely distichous), mostly crowded into a rosette, usually very succulent, often with marginal teeth. Inflorescences axillary, pedunculate racemes, often branched. Flowers 3-merous, regular, sometimes slightly irregular. Perianth 3 + 3 , fused, very rarely free, fleshy. Stamens 3 + 3, free. Ovary superior, 3-chambered: style simple, long, with small stigma. Fruit a many-seeded capsule. Seeds flat or 3-winged, dry.

Aloe macrocarpa Tod.
Acaulescent rosette-forming herb (rarely developing short erect stems in wetter, shady areas). Leaves 16–20(-35) cm long, usually with many spots and darker longitudinal lines, marginal teeth 10–24 per cm and brown tipped. Inflorescences erect, 100 cm long, racemes (1-)3–5(-7). Perianth 19–30(-35) mm long with distinct globose basal swelling, outer lobes free for 5–6 mm, red, very rarely yellow.

UL. Rocky outcrops in grassland, woodland mosaic. Locally common. Flowers in the wet season.

Note. New record for the Simen.

Fig. M3. – A-E, Kniphofia *spp.; A,* K. pumila*; B-C,* K. isoetifolia*, B, red-, C, uncommon yellow-flowered form; D-E,* K. foliosa*, E, stunted plants at edge of escarpment. – F,* Aloe macrocarpa.


A
B
C
D
E
F

Aloe steudneri Schweinf.
Acaulescent or short-stemmed herb. Leaves to ca. ½ m cm long, without spots, numerous in a rosette, marginal teeth often reddish, 4–12 per cm. Inflorescences 11–35 cm long, branched, with 1–5 racemes. Perianth (30-)35–40 cm, outer lobes free to base, pale red to orange red.

ESC, (UL). Steep slopes; seasonally wet cliff-faces. Rare. Flowers in the wet season.

Note. Endemic to Northern Ethiopia.

Aloe pulcherrima M.Gilbert & Sebsebe
Prostrate or pendent shrub with unbranched stem to ca. 1 m long. Leaves up ca. ½ m long, in dense rosettes, with fine longitudinal lines; marginal teeth hardy discernible (up to 3 per cm) and purple. Inflorescences often U-shaped, 12–28 cm long, racemes 3–6(-11). Perianth 32–33 mm long, outer lobes free for ca. 20 mm, red.

LL, (ESC). Steep slopes and cliffs with scrub; vertical rock-faces. Rare. Flowers at the beginning of the wet season.

Note. New record for the Simen; endemic to Ethiopia.

HYACINTHACEAE (194)
Bulbous herbs. Leaves in basal rosette or absent, with or without spots. Scape (leafless flower-stalk arising from the ground) smooth. Inflorescences racemose or spicate, rarely much branched and complex. Flowers regular. Perianth segments 6, free or fused into a tube. Stamens 6, mostly free. Ovary superior, 3-chambered, with 1 to many ovules per locule. Fruit a capsule, rarely schizocarpous. Seeds black, ± globose or flat, sometimes winged.

Drimia simensis (Hochst.) Stedje
Robust herbs to ca. ½ m tall, occurring in clusters (due to fused bulbs); leaves are produced after flowering. Scape usually erect. Inflorescences racemose, up to ca. 10 cm long; pedicels 5–8 mm long. Bracts usually with spurs. Perianth free, ca. 10 mm long, white with brownish mid-vein.

UL. Heavily grazed rocky grassland. Rare. Flowers in the dry season.

Note. Endemic to Ethiopia.

Drimia altimissima (L.f.) Ker-Gawl.
Herb well over 1 m tall, leaves usually appearing after flowering. Scape and bracts as in *D. simensis* but inflorescences up to 60 cm long with up to ca. 500 flowers, and with pedicels 13–45 mm long. Perianth free or united up to ca. 2 mm, white or greenish or greenish-white with purplish dorsal stripes.

LL. Montane grassland. Uncommon. Flowers in the wet season.

Note. New record for the Simen.

Albuca abyssinica Jacq.
Herb to 1.5 m tall, with large bulbs (to 8 cm in diam.). Leaves to ca 1 m long, hairy, lanceolate. Bracts without spurs. Perianth free, tepals 8–35 mm long, greenish-yellow, with a dorsal green band. Stamens clasping ovary.

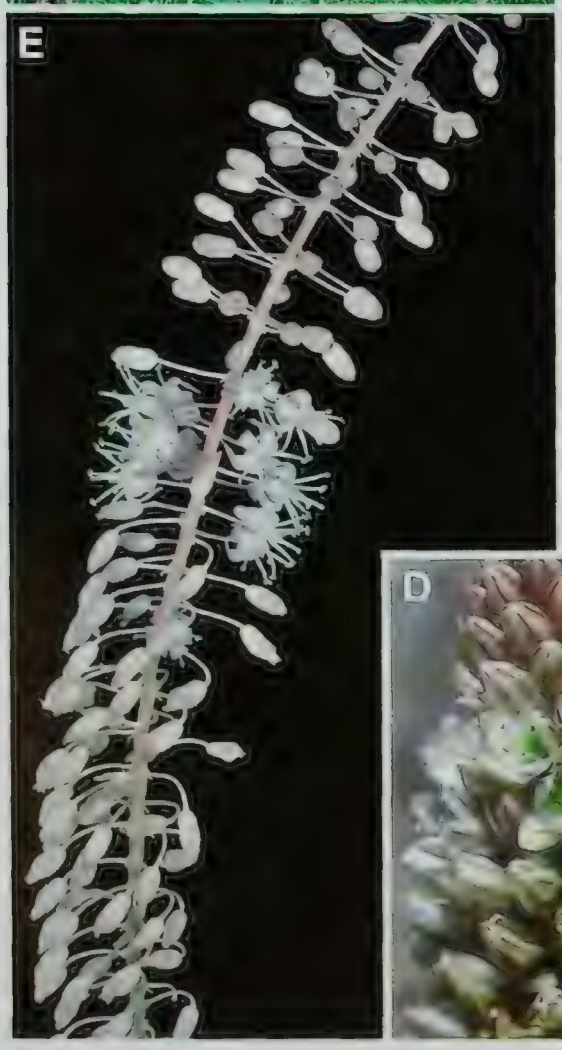
LL, **ESC**. Steep shady slope. Rare. Flowers in the wet season.

ALLIACEAE (195)
Bulbous herbs with strong smell of garlic or onion when crushed. Leaves in basal rosette. Inflorescences a false umbel or a head. Flowers regular. Perianth segments 6, free or fused. Stamens 6, epipetalous, flat. Ovary superior, 3-chambered. Fruit a capsule. Seeds triangular, ± ovoid or tetrahedral.

Fig. M4. – A-B, Aloe *spp.; A,* A. steudneri*; B,* A. pulcherrima. *– C-E,* Drimia *spp.; C-D,* D. simensis*, C, flowering in leafless state (dry season), D, detail; E,* D. altissima. *– F,* Albuca abyssinica.

A

B


E

C

D

F

Allium subhirsutum L. subsp. **spathaceum** (Steud. ex A.Rich.) Duyfjes
Herb with well developed single, globose to ovoid bulb, garlic smell when crashed. Leaves 8–50 cm, (1-)2–3 per bulb, flat. Inflorescence-stalks solitary (sometimes 2 or 3), solid; flowers in umbels. Spathe opening along 1 slit, persistent. Perianth free, white. Seeds black.

LL. Rocky outcrops. Rare. Flowers in the wet season.

Note. Outside Ethiopia only known from N Sudan and Somalia. The remaining 2 subspecies occur in Europe and North Africa.

AMARYLIDACEAE (196)

Perennial herbs with bulbs. Leaves in basal rosette or in a double fan. Scape leafless. Inflorescences umbel-like. Flowers regular or slightly irregular, showy. Perianth 3 + 3 , fused. Stamens 3 + 3, free or fused into a ring-like "false corona". Ovary inferior, 3-chambered. Fruit a berry or a capsule. Seeds black or greyish green, globose or flat.

Crinum abyssinicum Hochst. ex A.Rich.
Herb with bulbs to ca. 15 cm in diam. Leaves to ca. 40 cm long, glaucous to grey-green, erect with distinct midrib. Scape 40–80 cm long. Flowers 2–6, sessile (rarely subsessile). Perianth bell-shaped at anthesis, pure white or sometimes slightly tinged pink on outside in apical parts; tube to ca. 10 cm long. Stamens unequal in length, bent or curved upwards.

LL. Among rocks. Uncommon. Flowers at the beginning of the wet season.

Scadoxus multiflorus (Martyn) Raf. subsp. **multiflorus**
Herb up to 70 cm tall; bulb 2–5 cm in diameter, with a distinct, often elongated rhizomatous part. False stem and cataphylls often red to brown spotted at the base. Leaves to 40 x 7 cm. Scape 12–20 cm long. Involucral bracts membranous or colorless or sometimes red tinged, dropping at anthesis. Inflorescences semi-globose. Perianth, filaments and styles scarlet, turning pinkish-red with age; perianth segments to ca. 2.5 cm long, filaments ± equally long. Fruit a globose berry, ca. 1 cm in diam.

LL. In grassland and scrub. Uncommon. Flowers in the dry season.

Note. The species is divided into three subspecies; all Ethiopian material belongs to subspecies *multiflorus*.

IRIDACEAE (197)

Perennial herbs with rhizomes, bulbs or corms, rarely annuals and shrubs with woody caudex. Leaves basal and cauline, sometimes reduced (cataphylls). Inflorescences umbel, spike (rarely solitary) enclosed in opposed leafy to dry bracts (spathe). Flowers regular or irregular, pedicellate or sessile. Perianth 3 + 3 (rarely one whorl absent), free or fused, showy. Stamens 3, epipetalous, free or fused. Ovary inferior, 3-chambered. Fruit a capsule (rarely indehiscent). Seeds globose to angular or discoid, sometimes broadly winged, usually dry (rarely fleshy).

1 Outer tepals large, spreading, blue with yellow nectar guides; inner tepals smaller, erect, blue without nectar guides; styles with petaloid branches ..... *Moraea schimperi*
Flowers not as above..... 2

2 Flowers solitary; plant stemless, all leaves at ground; perianth tube shorter than tepals ..... *Romulea fischeri*
Flowers 2–many; some leaves on well developed stems; perianth tube longer or shorter than tepals... 3

3 Flowers regular, pink ..... *Hesperantha petitiana*
Flowers irregular 4

4 Leaves not sheathing; flowers blue ..... *Lapeirousia schimperi*
Leaves sheathing; flowers red, green with yellow tips or white ..... 5 (*Gladiolus*)

Fig. M5. – A, Allium subhirsutum *subsp.* spathaceum. *– B-C*, Crinum abyssinicum, *C, habitat (nr. Antola). – D-F*, Scadoxus multiflorus, *E, plant with tuber; F, cataphyll at base of (false) stem.*

A
B
C
D
E
F

5 Upper tepals red, lower tepals green with yellow tips ..... *Gladiolus abyssinicum*
Tepals white with pink flush or pink ..... *Gladiolus roseolus*

Moraea schimperi (Hochst.) Pic.-Serm.
Perennial herb to ca. 50 cm tall, with 1.5–2 cm wide tunicate corms. Leaves single, bifacial (clearly distinct upper and lower surfaces) and channelled (often emerging at flowering time), solitary. Flowers blue-purple with yellow nectar guides on outer tepals. Outer tepals 40–60 mm long, spreading, inner tepals 35–45 mm long, erect. Stamens opposite, adpressed to petaloid style branches. Capsules cylindrical, to ca. 3 cm long; seeds flat or discoid, 30–45 mm long.
UL. Heavily grazed rocky grassland. Rare. Flowers in the dry season.
Note. New record for the Simen.

Lapeirousia schimperi (A.Sch. & Klatt) Milne-Redh.
Perennial herb to 60 cm tall, with 18–22 mm wide bell-shaped corms. Leaves in 3 pairs or more, lower ones usually longer than inflorescences. Perianth fused, without nectar guides, blue with dark purple streaks. Stamens unilateral, exserted. Capsules partly enclosed in bracts, to ca. 1 cm long; seeds globose (slightly angular), 2-2.5 mm wide.
LL. Rocky grassland. Uncommon. Flowers in the wet season.

Hesperantha petitiana (A.Rich.) Baker
Perennial herb to ca. 25 cm tall, with 7–12 mm wide globose corms. Leaves in 3-4 pairs, upper ones entirely sheathing the stem. Inflorescence a spike. Perianth fused, pale pink or lilac. Style usually dividing at the mouth of perianth tube into three long spreading branches. Capsules ca. 1 cm long; seeds globose, sometimes slightly winged.
UL, ESC. Among rocks, grassland. Common. Flowers in the wet season.

Romulea fischeri Pax
Perennial herb to ca. 10 cm high, with 7–10 mm wide globose corms tapering to base. Leaves in (2-)3–5 pairs with slightly raised midrib. Inflorescences solitary, inner floral bracts with a broad scarious, irregularly brown streaked margin. Perianth fused, whitish pink striped, curving outwards at top. Capsules ovoid-loblong, to ca. 1 cm long.
UL, ESC. Grassland. Common. Flowers in the wet season.

Gladiolus roseolus Chiov.
Perennial herb to ca. 75 cm tall, with 25–30 mm wide corms. Leaves 2–4, entirely sheathing, sometimes with short lamina. Inflorescence a spike, flowering stem without long-bladed foliage leaves. Flowers irregular. Perianth usually facing one side, whitish with pinkish flush to pink, sometimes with minute spots. Capsules ca. 2 cm long; seeds broadly winged.
LL. Rocky meadow. Rare. Flowering season unknown.

Gladiolus abyssinicus (Brongn. ex Lem.) Goldblatt & de Vos
Perennial herb to ca. 75 cm tall; corms 15–25 mm wide, often with numerous cormlets. Leaves 5–6. Inflorescence a spike, flowers subtended by large foliar bracts. Perianth red (upper three) and greenish tipped yellow (lower three), without spots. Capsules ca. 1 cm long; seeds with reduced wing-like extension at one or both ends.
LL, UL. Edge of forest patches and scrub. Uncommon. Flowers in the wet season.

COLCHIACEAE (198)
Erect or twining herbs with subterranean (rarely stoloniferous) corms. Leaves sessile (sometimes with pseudo-petiole), rarely ending in tendrils. Inflorescences racemes, rarely solitary. Flowers regular. Perianth 3 + 3 , free or fused. Stamens free. Ovary superior, 3-chambered. Fruit a capsule. Seeds globose or ovoid.

Fig. M6. – A. Moraea schimperi. *– B.* Lapeirousia schimperi. *– C.* Hesperantha petitiana. *– D.* Romulea fischeri. *– E-F,* Gladiolus abyssinicus, *note large bracts enveloping some of the flowers.*

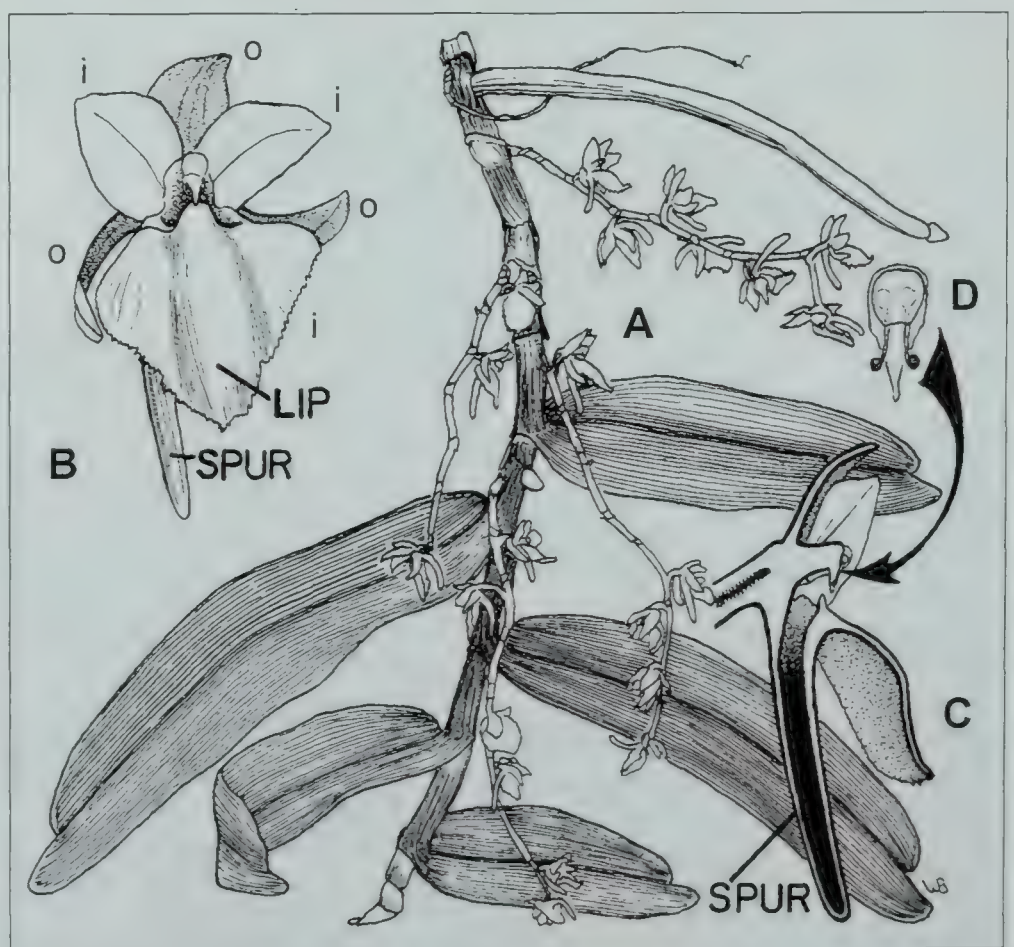
A
C
B
D
F
E

Androcymbium striatum Hochst. ex A.Rich.
Acaulescent or scapose geophytic herb with asymmetrical corms. Leaves 2–3, ascending. Scape erect. Flowers clustered in heads, overtopped by exterior petal-like bracts. Perianth white, 1 cm long, tepals clawed. Capsule to 1 cm long, with a persistent style.
LL. Open grassland. Rare. Flowering season unknown.

Merendera schimperiana Hochst.
Acaulescent geophytic herb with globose to ovoid corms. Leaves 2–3, in basal rosette, ascending or spreading. Flowers 1–2 (rarely 3), subsessile in the centre of rosette of leaves. Perianth purple; tepals to ca. 3 cm long, each with a long filiform claw.
LL, UL. (Disturbed and overgrazed) grassland. Common. Flowers in the dry and wet season.

ORCHIDACEAE (200)

Herbs growing on the ground (terrestrial) or on other plants (epiphytic), sometimes saprophytic and without chlorophyll (not in the Simen), with rhizomes or corms. Leaves mostly basal, alternate or occasionally opposite, sometimes swollen near base to form a pseudobulb. Inflorescences spicate, racemose or paniculate (rarely with secund flowers). Flowers irregular, usually borne on a twisted stalk (pedicel and ovary), with a complex structure. Perianth in two whorls of 3 segments, outer whorl ("sepals") free or sometimes fused above the ovary, inner whorl ("petals") free or united into a tube, unequal, one petal usually larger than the other two and called lip or labellum, often showy and with a basal spur or nectary. Stamen only one (in Simen orchids), completely united with style and stigma to form a column (also called gynostemium); pollen remaining together to form pollen masses (pollinia), which are usually found on or under the front of the column and concealed by an anther cap. Ovary inferior, at first resembling the pedicel, 1-chambered. Fruit a capsule with very numerous and minute, often dust- or powder-like seeds.



Orchidaceae flower structure (B-D), using the epiphytic Diaphananthe schimperiana *(A, habit; see also Fig. 9E) as an example; B, front view of flower [o, outer and i, inner whorl of perianth; larger tepal of inner whorl (= lip or labellum), with spur]; longitudinally sectioned flower showing part of ovary, column and lip with spur; D, front view of column (from* Burger *1967: fig. 74, modified)*

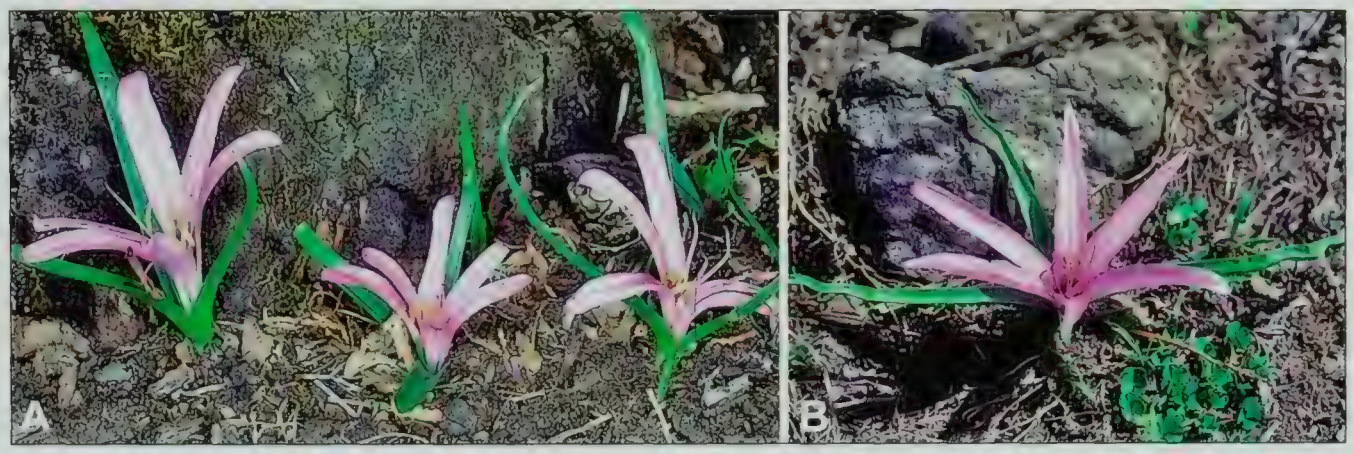


Fig. M7. – Merendera abyssinica, *A, plants in side view and B, from above.*

1 Epiphytes 2
Terrestrial herbs 4

2 Plants leafless ..... *Microcoelia globulosa*
Plants with leaves 3

3 Stem with pseudo-bulbs ..... *Bulbophyllum josephii*
Pseudo-bulbs absent; stems with conspicuous aerial roots longer than leaves ..... *Diaphananthe*

4 Flowers with 2 spurs ..... *Satyrium schimperi*
Flowers with 1 spur or spur± absent 5

5 Spur formed by dorsal sepal (or spur absent) 6
Spur formed by lip 7

6 Inflorescences several- to many-flowered ..... *Disa*
Inflorescences 1–3-flowered ..... *Disperis*

7 Sepals green or dull yellow veined and mottled with brown; petals yellow, lip with rounded, brownish-purplish side-lobes ..... *Eulophia streptopetala*
Flowers not as above 8

8 Dorsal sepal and 2 lateral petals form a helm ..... *Habenaria*
Arrangement of sepals and petals not as above ..... 9 (*Holothrix*)

9 Petals, including lip, with finger-like linear appendages; spur 12–15 mm long ..... *Holothrix praecox*

Petals without such appendages, but lip sometimes lobed; spur (much) shorter .....
..... *Holothrix squammata*, *H. brongniartiana*, *H. unifolia*

Holothrix A.Rich. ex Lindl.

Terrestrial herbs (to ca. 30 cm tall) with small roundish tubers and 1 (*H. unifolia*) or 2 sessile ovate to orbicular leaves. Inflorescence stalk erect; racemes elongate, dense and many-flowered or lax, several-flowered. Flowers small (< 1 cm in diam.), with free subequal sepals, shorter than the petals. Petals, incl. lip, undivided or lobed or with finger-like linear appendages. Lip with short to relatively long spur, joined to the short column.

Four species are recorded from the Simen Lowlands, mostly growing in grassland and/or in shady places (under shrubs or trees, in gullies, etc.). – (1) *H. praecox* is easily distinguished from the other species by the key characters given above. – (2) *H. unifolia* is unique in having only 1 leaf. – (3) *H. squammata* has entire, not lobed petals, and the lip is only slightly larger than the other petals. – (4) *H. brongniartiana* has a lip, rounded or very shortly bilobed at the tip, which is 3–4 times longer than other perianth members.

Habenaria Willd.

Terrestrial herbs (in the Simen) with elongated fleshy or tuberous roots and unbranched stems. Leaves variously arranged (see below). Inflorescence terminal, several- to many-flowered. Flowers usually twisted 180°, usually white and/or green. Sepals usually free, the

dorsal sepal often forming a helm with the 2 sepals. Petals entire or variously divided, often 2-lobed nearly to the base. Lip usually slightly joined to the base of the short or long column, spurred; spurs either short and sac-like or long and slender.

The 7 species recorded to the Simen belong to 5 different sections of the genus:

Sect. DIPHYLLAE. – Plants with 2 basal, large, roundish leaves pressed to the ground
[vs. leaves borne along the stem and not pressed to the ground in the other sections]

Habenaria armatissima Rchb.f.
Basal leaves to 18 x 22 cm. Inflorescence 10–20 cm long, several- to many-flowered. Flowers white. Petals bipartite nearly to the base. Lip with pendent slender spur to over 20 cm long.

LL. Forest, open swampy places, by streams. Rare. Flowering season unknown.

Sect. PSEUDOPERISTYLUS. – Petals entire and spur short, < 1—2 mm, globose.
[vs. spur much longer than 2 mm and not globose in the following sections]

Habenaria lefebureana (A.Rich.) T.Durand & Schinz
Small herb to ca. 15 cm with leafy stem. Inflorescence 2–5 cm long, densely many-flowered. Flowers very small (< 1 cm in diam.), fragrant, white.

UL, ESC. Steep rocky slopes. Uncommon. Flowers in the wet season.

Habenaria petitiana (A.Rich.) T.Durand & Schinz
Herb to 1 m tall. Stem leafy along its whole length. Inflorescence to ca. 20 cm long, ± densely many-flowered. Flowers small, green or yellowish green.

LL, ESC. Grassland. Rare. Flowers in the wet season.

Sect. COMMELYNIFOLIAE. – Inflorescence cylindrical, densely many-flowered.
[vs. inflorescence slender, narrow and/or laxly flowered in the following two sections]

Habenaria platyanthera Rchb.f.
Herb 20–30 cm tall with erect leafy stem. Inflorescence 5–10 cm long, densely many-flowered. Flowers small (to ca. 1 cm in diam.), greenish. Spur deeply bilobed at its tip.

LL. Grassland. Rare. Flowering season unknown.

Note. Endemic to the Simen.

Sect. MULTIPARTITAE. – Side-lobes of lip divided into narrow segments.

Habenaria decorata A.Rich.
Herb 20–30 cm tall. Stems with 3–7 leaves, the largest to 10 x 4 cm. Inflorescence to 15 cm long, ca. 1–10-flowered. Flowers large (ca. 3 cm in diam.), white. Lip 3-lobed, the 2 side-lobes divided on their outer margins into 4–6 narrow threads. Spur pendent, 30 mm long.

ESC, UL. In *Erica* forest. Rare. Flowers in wet season.

Habenaria macrantha A.Rich.

Similar to the above but sometimes taller and flowers green or whitish-green and slightly larger.

LL, (UL). Grassland and swampy areas in *Erica* forest. Rare. Flowering season unknown.

Sect. CHLORINAE. – Side-lobes of lip entire.

Habenaria bracteosa A.Rich.
Herb up to ca. 1 m tall. Stems with 5–10 leaves, the largest up to 30 x 3 cm. Inflorescence to 50 cm long, ± many-flowered. Flowers small (ca. 1 cm in diam.), green or yellowish-green. Lip 3-lobed, the side-lobes entire. Spur slender, 15-28 mm long.

LL. Montane forest patches, grassland. Uncommon. Flowers in the wet season.

Disa pulchella Hochst. ex A.Rich.
Terrestrial erect herb ca. 10–30 cm tall, with tuberous roots and leafy stem. Inflorescence ca. 4–10 cm, cylindrical to ± conical, several- to many-flowered. Flowers quite small, white to

Fig. M8. – A-B, Habenaria *spp.; A,* H. petitiana, *habit, B,* H. decorata, *flowers – C-D,* Disa pulchella, *C, habit. D, detail.*

purplish, sweetly scented. Dorsal sepal with straight spur 4–6 mm long. Petals entire. Lip ca. 5 mm long. Leaves largest in the centre of stem, lanceolate to linear-elliptic, acute. Dorsal sepals with spurs. Petals entire, broader than longer, truncate or slightly bilobed on front margin. Lip prorect or deflexed, fleshy, folded back on itself. Stigma sessile.

UL. *Erica* thickets and grassland. Rare. Flowers in the dry season.

Note. Only known from Ethiopia and the mountains of Yemen.

Disa scutellifera A.Rich.

Similar to the above but often taller and with larger, pink to mauve or bright carmine flowers. Spur pendent, petals bilobed above, lip larger (to ca. 10 mm long).

LL. Damp grassland, rocky slopes. Rare. Flowering season unknown.

Satyrium schimperi A.Rich.
Terrestrial erect herb ca. 15–60 cm tall, with tuberous roots. Leafy stem with 2 nearly opposite large leaves towards the base. Inflorescence narrowly cylindrical, 5 to > 20 cm long, several- to many-flowered. Flowers small (ca. 1 cm in diam.), green or yellow-green. Lip with 2 spurs at the base, 5–8 mm long; spurs parallel to ovary.
UL. Grassland. Rare. Flowering season unknown.

Disperis anthoceros Rchb.f. var. **anthoceros**
Terrestrial herb, 8-30 cm tall, with hairy tubers and 2 opposite, sessile leaves towards the stem base. Inflorescence 1–3-flowered. Flowers medium-sized (ca. 2 cm or more in diam.), pale pink to whitish, sometimes spotted. Dorsal sepal forming an erect, elongate spur to ca. 2 cm long. Lateral sepals with a conical pouch near inner margin.
LL. Montane forest, in shade, along streams. Rare. Flowers in the wet season.

Disperis crassicaulis Rchb.f.
Similar to the above but smaller (only to 5 cm tall) and with only 1 prostrate leaf at stem base. Flowers much smaller (ca. 1 cm in diam.), pale yellow to yellowish-green. Dorsal sepal and petal forming an open hood, a spur absent.
UL. Grassland. Rare. Flowering season unknown.
Note. Endemic to Ethiopia.

Bulbophyllum josephii (Kuntze) Summerh.
Epiphytic herb with 1-leafed pseudo-bulbs clustered on short rhizomes. Leaves leathery, oblong, to ca. 15 x 2.5 cm. Inflorescence pendulous, usually longer than the leaves, densely many-flowered. Flowers small (to ca. 1 cm in diam.), (greenish-)white or yellowish, tipped with crimson or pink.
LL. On tree trunks. Rare. Flowers in the wet season.

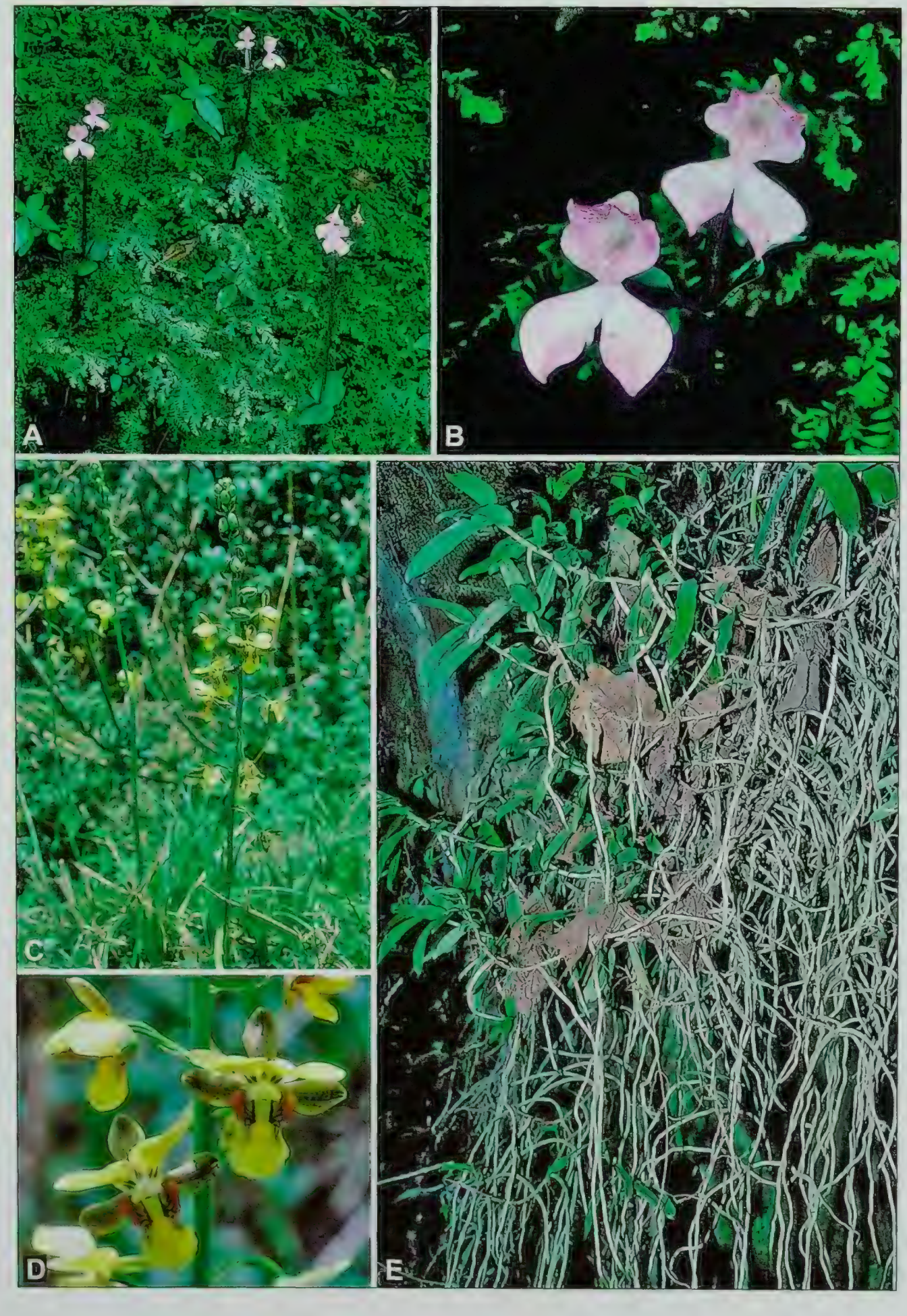
Eulophia streptopetala Lindl. var. **streptopetala**
Robust terrestrial herb to > 1 m tall, with conspicuous, clustered, leafy pseudo-bulbs above ground. Leaves to > ½ m long. Inflorescence laxly flowered. Flowers large (> 3 cm in diam). Sepals green or dull yellow veined and mottled with brown; petals yellow, lip with rounded, brownish-purplish side-lobes.
LL. Slopes above streams, edge of forest or scrub. Rare. Flowers in the wet season.

Microcoelia globulosa (Hochst.) L.Jonsson
Leafless epiphytic herb with short stem and undulating and twisting aerial roots, several cm long. Inflorescences several cm long, with up to 15 flowers each. Flowers small (ca. 1 cm in diam.), white.
LL. Forest along stream, epiphytic on *Euphorbia ampliphylla*. Rare. Flowers in the beginning of the wet season.

Diaphananthe schimperiana (A.Rich.) Summerh.
Pendent epiphytic herb with stems to ca. ½ m long, with numerous long aerial roots. Leaves unequally and roundedly bilobed at apex. Inflorescences < 10 cm long, laxly 5–10-flowered. Flowers small (ca. 1.5 cm in diam.), white to creamy-white. Spur incurved, < 1 cm long.
LL. Forest in steep shady gullies. Rare. Flowers in the wet season.

VELLOZIACEAE (202A)
Plants with fibrous, often erect stems covered with persistent leaf sheaths. Leaves linear, spirally set, crowded at the ends of stems, fibrous, forming a sheath around the stem. Flowers regular, showy. Perianth segments 3 + 3, free or basally united. Stamens 6. Ovary inferior, 3-chambered. Fruit a capsule. Seed reddish brown, with endosperm.

Fig. M9. – A-B, Disperis anthoceros, *A, habit, B, flowers. – C-D,* Eulophia streptopetala, *C, habit, D, flowers. – E,* Diaphananthe schimperiana, *epiphytic plant with aerial roots.*


A
B
C
D
E

Xerophyta schinzleinia (Hochst.) Baker var. **schinzleinia**
Herb to ca. 30 cm tall with stems cylindrical or ± thickened at base; leaf sheath dull brown, remain straight after abscission. Leaves linear, filiform. Flowers solitary, white or flushed with mauve or pink; ovary covered with broad-based, simple trichomes. Capsule globose.
LL. Dry rocky slopes. Rare. Flowers in the wet season.

MUSACEAE (203A)
Large herbs with rhizomes or corms and erect, unbranched pseudo-trunks (formed by sheathing bases of lower leaves). Leaves spirally arranged, large to very large (in Simen), with stout midrib. Inflorescences drooping or turned to one side. Flowers irregular, unisexual; lower flowers of an inflorescence female, upper flowers male. Perianth 3 + 3, free or fused. Stamens 5 (rarely 6), free. Ovary inferior, 3-chambered. Fruit often with a leathery pericarp and a fleshy pulp. Seeds few to many, hard, with endosperm.

The edible fruit banana (*Musa x paradisiaca*) is cultivated in some of the low areas around the Simen but not in the mountains itself.

Ensete ventricosum (Welw.) Cheesman
Banana-like herb with pseudo-trunk up to ca. 7 m tall. Leaves crowded at the end of the pseudo-trunk. Inflorescences pendulous, with persistent bracts. Perianth whitish or pale lilac to pink. Fruits (mostly hidden by persistent bracts) leathery, containing very little pulp, orange when mature, with a few large, globose black seeds.
LL. In gullies, along streams. Uncommon. Flowers in the wet season.
Note. While 'enset' (or 'ensat') is widely cultivated and a main source of food in other parts of Ethiopia (notably in the South-central regions), plants are not used and planted by the inhabitants of the Simen. In the mountains, the species is only encountered in its natural habitat.

COMMELINACEAE (207)
Perennial or annual herbs with ± succulent stems and swollen nodes. Leaves alternate, with a closed sheath at the base enveloping the stem. Inflorescences terminal or axillary, variously modified. Inflorescences terminal or axillary. Flowers regular or irregular, borne in boat-shaped bracts (spathes). Sepals 3, green. Petals 3, equal (*Cyanotis*) or unequal (*Commelina*) mostly blue to white or yellow, free or united into a tube at the base (*Cyanotis*). Stamens 6, all fertile (*Cyanotis*) or 3 (*Commelina*) or 4 sterile; often with brightly coloured hairs on filaments (*Cyanotis*). Ovary superior, 2–3-chambered. Fruit a capsule (rarely indehiscent). Seeds small, numerous.

Cyanotis polyrrhiza Hochst. ex Hassk.
Perennial herb with fusiform or carrot-like roots, tapering away from the base. Stems creeping with ascending branches, ca. 30 cm long. Spathe variable in size, smooth, white with purple tinge. Flowers regular. Corolla blue to purplish, ca. 1 cm. Stamens 6, all fertile, filaments with beaded blue hairs. Anthers orange-yellow.
UL. Rocky grassland; in cracks of rock sheets. Uncommon. Flowers in the wet season.
Note. Endemic to Ethiopia.

Cyanotis barbata D.Don
Similar to the above but with a small corm just below the soil surface and with ± erect stems. Spathe 1, folded along midrib, purple tinged. Corolla purplish-blue to pinkish, ca. 1 cm. Filaments with beaded whitish-pinkish hairs.
UL, ESC. Rocky outcrops; marshy areas along streams, etc.; grassland. Common. Flowers in the wet season.

Fig. M10. – A. Xerophyta schinzleinia, *flowering plant. – B-C.* Ensete ventricosum, *C. fruiting plants. – D-F,* Cyanotis *spp.; D-E,* C. polyrrhiza, *D. flowers, E. tuber-like roots; F,* C. barbata, *flowering branch.*

A
B
D
C
E
F

Commelina africana L.
Perennial herb with fusiform tuberous, fleshy roots and creeping or straggling stems. Leaves linear-lanceolate to ovate, to ca. 7.5 cm long. Spathe longer than broad. Flowers yellow, irregular, 1 petal small, 2 paired petals much larger, clawed, broader than long. Capsule 3-5-seeded.

LL, UL. Montane and alpine grassland. Common. Flowers in the wet season.

Commelina subulata Roth.
Annual herb with erect or creeping-ascending, usually brownish-purplish stems. Leaves subulate, to ca. 1.5 cm long. Spathe sharply recurved. Flowers as above but pale orange and with paired larger petals not broader than long. Capsule 5-seeded.

LL. Rocky places in grassland. Rare. Flowers in the wet season.

Note. New record for the Simen.

Commelina benghalensis L.
Erect or creeping-ascending robust perennial herb with fusiform roots. Stems to well over 1 m long, often rooting at the lower nodes. Leaves pseudo-petiolate, ovate to lanceolate, to ca. 10 cm long. Spathe broader than long. Flowers as above but with deep blue paired larger petals; filaments blue, the 3 sterile stamens with cross-shaped, yellow infertile anthers. Capsule 3-5-seeded.

LL. Moist places by streams. Locally common. Flowers in the wet season.

Note. New record for the Simen.

JUNCACEAE (211)
Mostly annual and perennial herbs. Stems usually erect, cylindrical. Leaves mostly basal, grass-like or cylindrical, with closed or open basal sheaths. Inflorescences terminal, cymose (an 'anthela') or paniculate. Flowers usually bisexual, regular, small. Perianth segments 3 + 3, papery, not showy. Stamens 3 or 6, opposite to perianth. Ovary superior, 1–3-chambered. Fruit a capsule. Seeds 3 to many, sometimes with basal outgrowth.

Juncus punctorius L.f.
Robust perennial herb with horizontal rhizome; stems up to 80 cm tall. Lower 2 leaves without blades, consisting of sheaths only, upper leaves with a 5–50 cm long, stem-like, distinctly transversely walled cylindrical blade. Inflorescence consisting of few to numerous hemispherical to globose dense head of flowers. Perianth light to dark red-brown. Capsule ovoid with apiculate apex, light to dark red-brown, many-seeded.

LL. Swamps; wet areas along streams. Uncommon. Flowers in the wet season.

Juncus dregeanus Kunth subsp. **bachitii** (Steud.) Hedberg
Tufted perennial herb with short rhizome; stems erect, 10–45 cm tall. Leaves many, near stem base, with well developed, flat or slightly channeled blades to 25 cm long. Flowers in dense head-like clusters. Perianth blackish-brown. Capsule in the previous species but subglobose to elliptic.

LL. Swamps; along streams, in shallow water. Uncommon. Flowers in the wet season.

Note. Subsp. *dregeanus* is restricted to South Africa.

Luzula abyssinica Parl.
Tufted herb, with angular stems to 50 cm tall. Leaves many, mostly near stem base, leaf margins with long white hairs. Flowers in a long, dense or interrupted, compound spike-like panicle. Perianth red-brown to almost black. Capsule with 3 seeds.

UL. Wet areas, such as along streams or at the edge of swamps. Rare. Flowering season unknown.

Fig. M11. – A-C. Commelina *spp.; A.* C. africana*; B.* C. subulata*; C.* C. benghalensis*. – D. swamp with* Juncus punctorius *(the willow* Salix mucronata *in the background).*

A

B

C

D

CYPERACEAE (212)

Grass-like herbs, usually with a perennial rhizome or stolon, sometimes with short internodes forming tuber or corm; often growing in moist or wet places. Stems often 3-angled. Leaves often arranged in 3 ranks, grass-like, usually forming sheaths that completely encircle the stem. Inflorescences variable, often cymose (an 'anthela') or a panicle of spikelets, sometimes head-like. Flowers bisexual or unisexual (*Carex* and *Scleria* in the Simen), small and inconspicuous, arranged in few- to several-flowered spikelets, each subtended by a glume. Perianth small and reduced or absent. Stamens 1–3, rarely to 6. Ovary superior, 1-chambered; styles 2–3. Fruit a small one-seeded nutlet, free or sometimes surrounded by a utricle (sac-like structure; *Carex*).

Selected morphological differences between Cyperaceae and "true" grasses (Pocaceae):

	Cyperaceae	Poaceae
Stem	usually not jointed; often triangular in cross-section	jointed with distinct nodes and internodes; internodes ± round in cross-section
Leaves	in 3 ranks; sheath closed (tubular); ligule absent or poorly developed	in 2 ranks; sheath splitting open and with overlapping margins; ligule usually present
Inflorescence	often umbel- or head-like; subtended by leaf-like bracts	usually spikes, racemes or panicles; not subtended by leaf-like bracts
Flowers	each flower in the axil of a single bract (glume)	each flower of a spikelet contained between 2 bracts (lemma and palea)

Taxa of the Cyperaceae occurring in the Simen can be keyed out as follows:

1 Flowers unisexual 2
Flowers bisexual 3

2 Female flowers and nutlets enclosed by a utricule (sac-like structure) ..... *Carex* [several spp.]
Female flowers and nutlets not enclosed by a utricule ..... *Scleria schimperiana*

3 Carpet-forming perennial with creeping or floating stems ..... *Isolepis fluitans*
Habit not as above 4

4 Plants with leaves reduced to leaf-sheaths ..... *Isolepis costata*
Plants with well developed leaf blades 5

5 Plants minute, stems to 1 cm long ..... *Isolepis omissa*
Plants larger, with 3-ranked, linear, grass-like leaves ..... *Cyperus* [numerous species]

Carex L.

Perennial herbs often forming compact and dense tussocks. Stems 3-angled. Leaves with well developed blades; sheaths completely encircling the stem. Inflorescences spikes or variously composed panicles of spikes, with individual spikes either unisexual or with female below and male above or vice versa. Flowers unisexual, female with 2-3 stigma branches, male with 3 stamens. Perianth absent. Nutlets completely enclosed by utricles.

Five species are recorded from the Simen, the most prominent in the Simen Uplands being *Carex monostachya* (see below). The others are: – (2) *C. conferta* (UL; swamps and other wet areas), a tufted perennial with a creeping rhizome and with leaves to > 1 cm wide. – (3) *C. erythrorrhiza* (UL; swamps; among rocks near or in streams), a robust perennial with red roots forming dense tussocks, sometimes with a pseudo-trunk up to 1 m tall, and with leaves only up to 3 mm wide. – The following two species are distinguished from (1)–(3) by open, less dense, > 2 cm wide inflorescences: – (4) *C. steudneri* (LL + UL; grassland, ericaceous scrub), a robust perennial with stems to 70 cm long and with an inflorescence of several, often pendulous brown panicles. – (5) *C. simensis* (LL + UL; moist grassland or forest; in vertical cliff faces), a tussock-forming perennial with stems ca. 15–40 cm long and with leathery, plicate and deeply keeled leaves and inflorescences of several erect to slightly drooping spikes.

Fig. M12. – Carex monostachya*; A, habitat (with Giant Lobelia,* Lobelia rhynchopetalum*), B, spike with male flowers above and female flowers below.*

Carex monostachya A.Rich.

Perennial forming large and dense tussocks to ca. 80 cm tall, with both sterile and fertile stems. Leaves 10–30 cm x ca. 2–4 mm, scabrid on margins. Inflorescence a solitary terminal spike with male flowers above and female flowers below.

UL. Alpine bogs, wet areas. Locally common. Flowers in the wet and dry season.

Cyperus L.
Mostly perennial herbs, tufted or wirth creeping rhizomes or stolons. Culms erect, to well over 1 m tall, mostly 3-angled. Leaves 3-ranked, linear and grass-like, the lower ones usually scale-like and covering the base of the stem and the rhizome. Inflorescence a terminal ± umbel-like open anthela, often consisting of numerous spikelets in distinct spikes, less commonly congested and ± head-like or spikelets in digitate clusters. Flowers bisexual, with 3–1 stamens and 3–2 styles. Nutlets 3-angled.

The numerous species are recorded from the Simen belong to 4 subgenera of Cyperus:

Subgenus PYCNOSTACHYS. – Inflorescence with digitate clusters of spikelets.
[vs. spikelets in distinct spikes in the following subgenera]

Cyperus dereilema Steud.
Robust tussock-forming herb with thick woody rhizome. Culms and leaves to over 1 m long. Leaves flat, rough at margins and ribs, sheaths not prominent, only seen at the very base of the flowering shoot. Inflorescences with digitately clustered numerous spikelets. Style falling off quickly, 3-lobed. Glumes 2–2.8 mm long, smooth, rounded apex.

LL. In forest, along streams. Locally common. Flowers in the wet season.

Subgenus KYLLINGA. – Inflorescences spherical to cylindrical heads of numerous crowded spikelets, subtended by involucral bracts similar to leaves.
[vs. inflorescences different in the following subgenera]

Cyperus bracheilema (Steud.) Mattf. & Kük.
Herb with short rhizomes and long, slender and thin stolons. Culms to ½ m long, leaves to 30 cm. Inflorescences dark purple to almost black, terminal heads of several crowded spikes, with 3–5 reflexed, leaf-like involucral bracts, the longest as long as the leaves. Spikelets 2–3-flowered.

LL. Wet grassland. Uncommon. Flowering season unknown.

Cyperus chlorotropis (Steud.) Mattf. & Kük.
Small tufted perennial without stolons. Leaves to 5 cm long. Inflorescence a dark purple head of 1 terminal cylindrical spike and 1–4 lateral spikes, subtended by 3–4 reflexed involucral bracts similar to leaves. Spikelets 1–3-flowered.

LL. Grassland, shallow soil on rocks. Uncommon. Flowering season unknown.

Cyperus controversus (Steud.) Mattf. & Kük.
A tussock-forming herb with short rhizomes and many culms to 40 cm long. Leaves to 30 cm long. Inflorescence a white or grey-brown solitary globose head with numerous crowded spikelets, subtended by 2–4 ± spreading, leaf-like involucral bracts. Spikelets 1-flowered.

LL. Grass- or bushland. Uncommon. Flowering seaon unknown.

Subgenus PYCREUS. – Inflorescences appearing head-like with few to many (sub)sessile spikelets, or consisting of one sessile spikelet-cluster plus some pedunculate clusters; styles 2 (rarely 3).

Cyperus elegantulus Steud.
Slightly tufted perennial with slender stolons (sometimes absent). Stems to 80 cm tall. Leaves to 30 cm long, lower ones reduced to bladeless sheaths. Inflorescence a single compact head of (sub)sessile clusters of spikelets, but often with 1 to several additional stalked clusters of spikelets. Spikelets closely packed and curved, 6–10-flowered.

LL, UL. Wet grassland, swampy areas. Uncommon. Flowering season unknown.

Cyperus nigricans Steud.
Robust perennial forming dense tussocks. Leaves from near the base only, to 60 cm or more long. Inflorescence compact, black, head-like, consisting of many crowded sessile spikelets: spikelets sometimes replaced by viviparous shoots.

LL. Marshy areas. Uncommon. Flowering season unknown.

Cyperus flavescens L.
Annual herb with slender root-system, occasionally with slender stolons. Stems ca. 5–50 cm long. Leaves 5–30 cm long. Inflorescence a dense globose cluster of sessile spikelets or commonly with 1 central head and 1–6 additional stalked heads of clustered spikelets. Spikelets pale yellow-brown or with a red-brown tinge.
LL. Seasonally wet and water-logged areas, swamp-edges. Uncommon. Flowering season unknown.

Subgenus CYPERUS. – Inflorescences terminal subumbel-like open anthelas, often with many spikelets in distinct spikes, more rarely congested into lax heads; styles 3 (rarely 2).

Cyperus rigidifolius Steud.
Slender to fairly robust perennial herb with a woody base and curving horizontal stolons. Culms to 50 cm tall. Leaves rather stiff, to 15 cm long. Inflorescence an anthela of one congested group of almost black spikelets, with or without 1–5 stalked spikes. Involucral bracts leafy, erect or spreading, approaching leaves in length.
LL. Grassland, disturbed places. Common. Flowers in the wet season.

Cyperus bulbosus Vahl
Similar to the above, but a perennial with a basal bulb covered by dark scales and with slender stolons ending in new bulbs. Inflorescence a lax anthela with 4–6 leafy bracts. Spikelets dark red-brown to yellow-green
LL. Seasonally wet areas. Uncommon. Flowers in the wet season.

Cyperus nutans Vahl var. **eleusinoides** (Kunth) Haines
Robust perennial with thick, sometimes nodular, creeping rhizome. Culms to over 1 m tall. Largest leaves to ca. ½ m long. Inflorescence an umbel-like anthela consisting of grey-brown spike clusters on peduncles ('rays') to > 10 cm long. Involucral bracts leafy, 10–40 cm long.
LL. Seasonal swamps, pools or streams. Uncommon. Flowers in the wet season.

Cyperus aterrimus Steud.
Robust perennial with woody base and scale-covered stolons. Culms solitary from stolons, to 90 cm tall. Inflorescence a large anthela consisting of clustered, often brush-like spikes on peduncles ('rays') to 8 cm long. Spikelets black. Involucral bracts leafy, shorter than leaves.
LL. Often near streams or bogs in forest. Uncommon. Flowers in the wet season.

Cyperus cyperoides (L.) Kuntze
Robust perennial with swollen stem base woody and a short woody rhizome. Culms to 80 cm tall. Leaves to 25 cm long. Inflorescence an umbel-like anthela of 6–18 spikes on peduncles ('rays') to > 10 cm long. Major involucral bracts 5–15, leafy, occasionally longer than leaves. Spikelets green-yellow, often with brown tinge.
LL. Weedy, in cultivated land, along paths, etc. Uncommon. Flowers in the wet season.

Cyperus cruentus Rottb.
Tussock-forming perennial with few to many clustered stem bases (often ± swollen, forming a pseudo-bulb). Stems 20–50 cm long. Leaves to 30 cm long. Inflorescence a dense 3-angled to hemispherical contracted anthela only 1–2 cm in diam. Involucral bracts 4–7 leafy, to as long as the leaves.
LL. Wood- or bushland. Uncommon. Flowering season unknown.

Cyperus plateilema (Steud.) Kük.
Robust perennial with slightly swollen stem base. Culms to 40 cm tall. Leaves to 30 cm long. Inflorescence a solitary variegated pale/dark red-brown, ± hemispherical head, < 2 cm in diam., subtended by 3–4 leafy involucral bracts shorter than the leaves.
LL. Grassland, rocky places. Uncommon. Flowering season unknown.

Isolepis R.Br.
Slender annual or perennial herbs with rhizomes or stolons. Stems long to very short (only to 1 cm in *I. omissa*), sometimes creeping or floating and forming carpets (*I. fluitans*). Leaves usually with well developed blades but sometimes reduced to leaf-sheaths (*I. costata*). Inflorescences terminal spikelets or terminal or axillary heads. Flowers bisexual, with 3–1 stamens and 3–2 styles.

Three taxa recorded from the Simen [(1) *I. costata*, (2) *I. fluitans* var. *nervosa*, and (3) *I. omissa*] are easily distinguished by the characters given in the generic description and in the key above. All three occur in the Simen Lowlands, (3) also in the Uplands. (1) and (2) occur in marshy areas, at the edge of pools and seasonally waterlogged areas, (3) in grassland.

Scleria is only represented by one species:
Scleria schimperiana Böck.
Robust annual herb with 3-angled stems up to 70 cm tall. Leaves to 40 cm long, with scabrid or short-hairy margins. Inflorescence of 1 terminal and 1–2 lateral panicles, widely spaced along the culm, spikelet either male or female. Flowers strictly unisexual, female flowers not enclosed by a utricle. Nutlets compressed subglobose (wider than high).

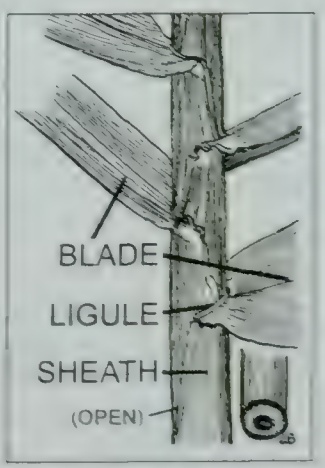
LL. Wet areas in grassland, open and swampy places along streams. Uncommon. Flowers in the wet season.

ARECACEAE (214)
Palms, usually trees with simple stem (rarely trunkless shrubs or climbers; not in the Simen). Leaves large to very large, spirally arranged to form a dense crown, sometimes with spines or prickles. Inflorescences axillary, single or clustered. Flowers bisexual or unisexual. Perianth segments 3 + 3, free or fused. Stamens 3–many, free or united, staminodes often present in female flowers. Ovary superior, 1–3-chambered. Fruits fleshy, with distinct epi-, meso- and endocarp (drupes), 1-seeded.

Phoenix reclinata Jacq.
Dioecious palm to 15 m tall; solitary trees or growing in clumps. Trunks leaning or erect, covered with persistent leaf sheaths above; crown with ca. 25 or fewer leaves. Leaves pinnately compound, to 3 m long; petiole with armed with spines, to > 10 cm long. Male flowers creamy-white, female ones greenish. Fruit yellow, orange or dull red, fleshy, ovate, to 2 cm long.

LL. Edge of forest; steep-sided valleys; along small watercourses. Locally common. Flowers in the wet season, fruits in the dry season.

POACEAE (GRAMINEAE) (215)
Annual or perennial herbs, sometimes with rhizomes and stolons, occasionally tall, woody (bamboos; not in the Simen). The stems (culms) often hollow between the nodes and usually round in section; nodes usually thickened and solid within. Leaves alternate or basal, borne in 2 opposite ranks; the leaf base clasping and enclosing the stem in a usually open sheath; the base of the leaf blade with a ligule. Flowers bisexual or sometimes unisexual, very small and without obvious perianth, subtended by 2 bracts (flower plus 2 subtending bracts = 'floret'). Each floret contains the reproductive structures (3, rarely 6, 2 or 1 stamens; a superior 1-chambered ovary bearing a style with 2 feather-like stigmas) enclosed in an outer bract (lemma) and an opposite inner bract (palea). The florets are borne singly or 2 or more in 2 ranks on a slender axis ('rachilla') that is subtended by 2 sterile bracts ('glumes'). This axis with floret(s) and



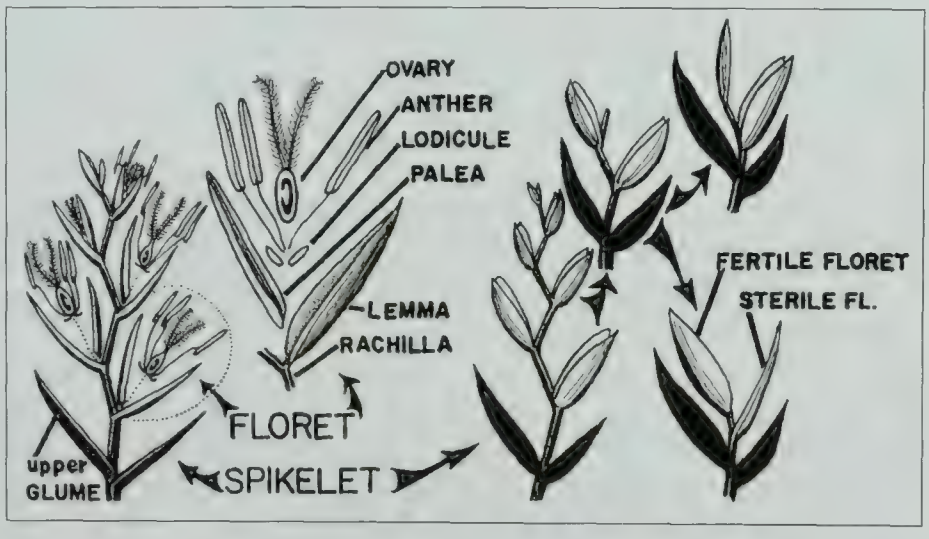
Poaceae: stem portion with leaves in two opposite ranks (from Burger 1967 fig. 72.2, modified)

Fig. M13. – A-B, Phoenix reclinata, *A, habitat (wet season), B, with fruiting inflorescences (dry season).*

subtending bracts is called 'spikelet'. The spikelet is the basic unit of the inflorescence of the Poaceae. Inflorescences vary from much-branched panicles to dense spikes, but the basic unit of these inflorescence types is always the spikelet which may be sessile or stalked. Fruit usually dry, indehiscent, with the single seed adhering to the ovary wall ('caryposis'); the fruit usually remains enclosed in lemma and palea.

The "true" grasses (Poaceae or Gramineae) and the Compositae (Asteraceae) are the largest plant families in the Simen. Currently, over 40 species of grasses belonging to 25 genera are recorded.

Poaceae are easily recognized as a family because of their unusual morphological features, although they may be confused with the Cyperaceae (see page 238 for a table of selected morphological differences bet-



Poaceae: structure of florets and spikelets (spikelet reduction on the right; from Burger *1967: fig. 72,3, modified)*

ween the two families). The grasses may, however, be extremely difficult to identify to *genus* and *species* level, especially if they are in a sterile state. Even in fertile condition, identification is not unproblematic: florets may have lost their sexual parts and may be present by sterile lemmas only; glumes may also have been lost; as a result, the spikelet structure may be difficult to interpret correctly. Grasses and their key features are also difficult to photograph.

For these reasons, the grass flora of the Simen is described here in a very abbreviated form. Anyone interested in full descriptions of the taxa occurring in the Simen should refer to Volume 7 of Flora of Ethiopia and Eritrea, which is entirely devoted to Poaceae (see page 37 for a full citation).

The tribes of grasses occurring in the Simen are briefly characterized below. The species that belong to them are at least mentioned; those that are – according to our subjective judgment – more common are described in somewhat greater detail.

Tribe POEAE. – Inflorescences open or contracted panicles (in the Simen); spikelets 1–4-flowered, usually awnless (*Poa* and *Colopodium* in the Simen), if awned (*Festuca* in the Simen) then leaf-sheaths smooth and palea rough, or uppermost reduced and then plant annual (*Vulpia*); glumes 2, usually persistent.

1 Spikelets 1-flowered ..... *Colopodium hedbergii*
Spikelets with more flowers 2

2 Spikelets without awns; panicles open ..... *Poa annua*, *P. leptoclada*, *P. schimperiana*, *P. simensis*
Spikelets with awns, or at least an awn-point to ca. 5 mm long; panicles contracted 3

3 Annual of disturbed habitats, slightly tufted or solitary; stamen 1 ..... *Vulpia bromoides*
Tufted perennials; stamens 3 ..... 4 (*Festuca*)

4 Plants forming loose tufts 5
Plants forming dense and compact tufts 6

5 Leaf blades inrolled, filiform, 20–35 cm long ..... *Festuca abyssinica*
Leaf blades flat, linear, 10–13 cm long ..... *Festuca simensis*

6 Culm-sheaths ± inflated ..... *Festuca richardii*
Culm-sheaths not as above 7

7 Culms 50–100 cm long; leaf-blades rough; spikelets wedge-shaped ..... *Festuca macrophylla*
Culms 30–35 cm long; leaf-blades smooth; spikelets narrowly oblong ..... *Festuca gilbertiana*

Colopodium hedbergii (Meld.) Tzvel.
Loosely tufted perennial with prostrate or ascending flowering shoots up to 40 cm long. Panicles open, 4–11 cm long, its lower branches reflexed. Spikelets 1-flowered, awnless.
UL. Muddy places (along stream sides, pools). Uncommon. Flowers in the wet season.
Note. In Ethiopia only known from the Simen and the Bale Mts.; elsewhere only in Kenya.

Poa annua L.
Delicate caespitose annual, up to 20 cm tall; flowering shoots erect or straggling and decumbent, up to 30 cm long. Inflorescence an open pyramidal panicle, 2–8 (rarely 12) cm long, with 3–5 flowered spikelets, green or often tinged with purple. Glumes with broad white margin, blunt at the tip; lemma silky-villous on the keel.
UL. Grassland. Common. Flowers in the wet season.

Poa leptoclada Hochst. ex A.Rich., **P. schimperiana** Hochst. ex A.Rich., and
P. simensis Hochst. ex A.Rich.
Tufted perennials with linear to filiform leaves. Panicles narrow and spike-like (typically in *P. leptoclada*) to loose and open. *P. leptoclada* and *P. schimperiana* are not clearly separable, and the two, in turn, may be similar to *P. simensis*.
LL, UL. All favour damp, shady situations (among rocks, along streams, etc.). Flowers in the wet season.

Fig. M14. – A, Poa simensis. *– B,* Festuca abyssinica, *stunted, high altitude form; shortly before anthesis (panicles not yet expanded).*

Vulpia bromoides (L.) S.F.Gray
Slender annual with narrowly oblong, contracted, usually erect panicles to ca. 10 cm long. Spikelets 3-10-flowered, awned.
UL. Pathsides, rocky places, in and around fields. Common. Flowers in the wet season.

Festuca abyssinica Hochst. ex A.Rich.
Perennial with loose tufts, culms ascending, usually < 1 m tall. Basal leaves inrolled, filiform, 20–35 mm long, smooth; upper usually flat. Panicles contracted, 8–20 cm long, dense with spikelets apressed to the main axis; spikelets 3–4-flowered, purple-green; glumes large and enveloping; lemmas mostly extended into an awn-point to ca. 5 mm long.
UL, (ESC). Afroalpine grassland; between rocks, moist places. Common. Flowers in the wet season.

Festuca richardii Alexeev
A segregate of, and very close to, *F. abyssinica*, distinguishable by a slightly different leaf anatomy. Plants tend to form denser tussocks than *F. abyssinica.*
UL. Grassland; on rocky mountain tops. Uncommon. Flowers in the wet season.

Festuca macrophylla Hochst. ex A.Rich.
Perennial forming large dense tussocks, with erect culms to 1 m tall. Leaves filiform to acicular, scaberulous. Panicles and spikelets as in *F. abyssinica* but distinguished by much shorter, narrower glumes.
UL. Grassland. Common. Flowers in the wet season.
Note. Only known from the northern highlands of Ethiopia.

Festuca gilbertiana Alexeev ex S.M.Phillips
Perennial forming large dense tussocks, with erect culms to 35 cm tall. Leaves filiform, stiff, smooth. Panicles stiff, only to ca. 7 cm long, reduced, raceme-like. Awn-points very short (< 3mm long).
UL. Grassland. Uncommon. Flowers in the wet season.
Note. Endemic to the Simen.

Festuca simensis Hochst. ex A.Rich.
Loosely tufted perennial with erect culms to > 1 m tall. Leaves linear, flat. Panicle narrow, 15–30 cm long, erect or slightly nodding. Distinguished from the *Festuca* spp. above by its long awns (up to almost 2 cm long).
UL. Mostly along streamsides in grassland. Uncommon. Flowers in the wet season.

Tribe MELICEAE. – Inflorescences contracted panicles ± resembling spikes (in the Simen); spikelets 1-flowered, uppermost florets of inflorescence reduced and often only with clusters of lemmas, otherwise bisexual. Glumes 2, persistent and membranous. – In the Simen only represented by:

Streblochaete longiarista (A.Rich.) Pilg.
Loosely caespitose straggling perennial with nodding inflorescences, distinguished by its hygroscopic, coiling awns, entangled with awns from other florets.
UL. Undergrowth in ericaceous forest. Common. Flowers in the wet season.

Tribe AVENEAE. – Inflorescences open to contracted, sometimes spiciform panicles; spikelets either all alike and awned or sometimes awnless, 2–7-flowered (1-flowered and bisexual in *Polypogon* and *Agrostis*) and stalked; uppermost florets male or sterile, otherwise bisexual, if only 2-flowered, the inferior male or sterile, the superior bisexual. Glumes 2, persistent, as long as or even longer than the spikelets, rarely shorter (*Helictotrichon*).

1 Spikelets without awns 2
Spikelets with awns 4

2 Inflorescences interrupted only at the base, otherwise continuous with dense and compact, sessile spikelets arranged along the main axis ..... *Koeleria capensis*
Inflorescences interrupted throughout, lax with numerous slender stalks emerging from each node bearing clusters of spikelets or sessile spikelets arranged into two rows along the main axis or inflorescences scarcely exserted from leaves 3

3 Spikelets purplish ..... *.Polypogon schimperianus*
Spikelets green or tinged with purple ..... *Agrostis sclerophylla*

4 Spikelets 1-flowered ..... Agrostis *quinqueseta*
Spikelets 2–4-flowered 5

5 Awns arising from the middle or the subterminal part of the lemma ..... *Helictotrichon*
Awns arising from ± the base of the lemma 6

6 Awns bent like a knee; delicate annual ..... *Aira caryophyllea*
Awns only obscurely twisted at base; robust perennial tussock grass ..... *Deschampsia caespitosa*

Koeleria capensis (Steud.) Nees
Densely tufted perennial; culms to ca. 75 cm long, lanate especially below the inflorescence. Leaves filiform to acicular Panicles linear, compactly spiciform, interrupted only at base, to ca. 15 cm long.
LL, ESC, UL. Grass- and scrubland; among rocks. Common. Flowers in the wet season.

Polypogon schimperianus (Hochst. ex A.Rich.) Cope
Tufted perennial with slender, weak, often prostrate culms rooting at lower nodes. Panicle narrow with ascending branches.
UL. Along streams; moist places. Uncommon. Flowers in the wet season.

Agrostis sclerophylla C.E.Hubb.
Compact perennial forming low cushions to 5 cm high. Leaves tough, subulate. Panicles erect, only c. 1 cm long, spike-like. Glumes covering most of the spikelet, purplish.
UL. Restricted to the highest areas (mountain summits above 4,000 m), growing among rocks. Uncommon. Flowers in the wet season.

Fig. M15. – A, Koeleria capensis *with inflorescences (wet season); B, slopes of the escarpment with tussocks of* Koeleria *and possibly also* Festuca macrophylla. *– C,* Helictotrichon elongatum.

Agrostis quinqueseta (Hochst. ex Steud.) Hochst.
Tufted perennial with short rhizomes and slender, ascending culms. Panicle erect, contracted to spiciform, to ca. 10 cm long
LL, **ESC**, **UL**. In scrub and ericaceous forest. Uncommon. Flowers in the wet season.

Helictotrichon elongatum (Hochst. ex A.Rich.) C.E.Hubb.
Tufted perennial with 2–6 m wide, flat leaves. Panicles oblong, often with pendulous branches. Awns to 2 cm long.
LL, UL. Grassland. Common. Flowers in the wet season.

Helictotrichon lachnanthum (Hochst. ex A.Rich.) C.E.Hubb.
Similar to the above but rhachilla internodes with long silky hairs.
LL. Scrubland. Uncommon. Flowers in the wet season.

Aira caryophyllea L.
Delicate annual with solitary or tufted culms, narrowly linear leaves and open, lax panicles to 10 cm long.
(LL), **UL**. Disturbed places in grassland. Uncommon. Flowers in the wet season.

Deschampsia caespitosa (L.) P.Beauv.
Robust perennial tussock grass with erect culms to > 1 m tall and leaves to ca. 30 cm. Paniclues flexuous, nodding, to 30 cm long.
UL. Marshy, waterlogged areas; along streams. Uncommon. Flowers in the wet season.

Tribe BROMEAE. – Resembling the Poeae but characterized by distinctive hairy apical appendages on the ovary. – In the Simen only represented by:

Bromus leptoclados Nees
Tufted perennial with culms to 2 m tall. Panicles large, diffuse, open, 20–30 cm long, erect or nodding. Spikelets narrowly oblong, to ca. 4 cm long; awns ca. 1 cm long.
UL. Shady, sheltered places among rocks. Uncommon. Flowers in the wet season.

Tribe BRACHYPODIEAE. – Inflorescences racemose, with spikelets arranged on opposite sides of the rachis and facing it laterally; spikelets few- to many-flowered, uppermost florets on racemes reduced, otherwise bisexual. Glumes 2, persistent. – A monogeneric Eurasian tribe in the Simen only represented by

Brachypodium flexum (L.) P.Beauv.
Diffuse tufted perennial with weak, slender culms to > 1 m long. Inflorescences to 15 cm long, with 4–10 spikelets. Each spikelet 6–12-flowered, oblong; awns to ca. 1 cm long
LL. Forest margins and clearing; in scrub and ericaceous forest. Uncommon. Flowers in the wet season.

Tribe TRITICEAE. – Inflorescences spicate, bilateral, the spikelets single or in clusters of 2–3 in two opposite rows. – In the Simen (both LL and UL) only represented by the cultivated cereals **Hordeum vulgare** (barley) and **Triticum spp.** (wheats).

Tribe ARUNDINEAE. – Inflorescences open or contracted panicles, sometimes reduced to few-spiculate racemes; spikelets several-to few-flowered, either all florets alike, bisexual or the uppermost reduced. Glumes 2, persistent, usually shorter than the spikelets.

Spikelets 2-flowered ..... *Pentaschistis*
Spikelets 3–5-flowered ..... *Rytidosperma*

Pentaschistis trisetoides (Hochst. ex Steud.) Pilg.
Slender tufted annual. Panicles narrowly elliptic to ovate, open to loosely contracted, to ca. 5 cm long.
LL. Grassland; as weed in cultivations. Common. Flowers in the wet season.

Pentaschistis pictigluma (Steud.) Pilg. var. **pictigluma**
Densely tufted perennial. Panicles contracted to spiciform, oblong, to > 10 cm long.
LL, UL. Grassland; in scrub; at high altitudes amongst rocks. Common. Flowers in the wet season.

Rytidosperma subulata (Hochst.) Cope
Compact tufted perennial. Inflorescence a reduced panicle, the lowermost branch often 2-spiculate, the 2–5 remaining spikelets borne directly on the main axis. Glumes up to ca.1.5 cm long. Lemmas bifid, awned from the sinus, awns to 1.5 cm long.
UL. Moist places in grassland. Uncommon. Flowers in the wet season.

Rytidosperma grandiflora (Hochst. ex A.Rich.) S.M.Phillips
Similar to the above. Inflorescence reduced to a 3–5-spiculate raceme, scarcely exserted from the subtending leaf-sheath. Distinguished by its long glumes and awns (3–4 cm long).
UL. Among rocks. Rare. Flowering season unknown.
Note. Only known from the type specimen, collected in the Simen Mts.

Tribe ERAGROSTIDEAE. – Inflorescences diverse, either open or contracted panicles or composed of one-sided racemes or spikes in (sub)digitate arrangement (*Eleusine*); spikelets several- to many-flowered (*Eragrostis*), sometimes 1-flowered (*Sporobolus*), all alike, uppermost florets reduced, otherwise bisexual. Glumes 2, persistent or deciduous.

1 Inflorescences subdigitate ..... *Eleusine coracana*
Inflorescences open or contracted panicles 2

2 Spikelets several- to many-flowered, laterally compressed ..... *Eragrostis macilenta*
Spikelets 1-flowered, not compressed, fusiform ..... *Sporobolus pellucidus*

Eleusine coracana (L.) Gaertn.
Tufted annual with culms up to ca. 1 m tall. Subdigitate inflorescences composed of ca. 5–20 linear brown spikes to ca. 10 cm long, clustered together at the culm tip. – A cereal cultivated in small fields in some areas of the Simen Lowlands; sometimes also found as an escape in disturbed places.

Eragrostis macilenta (A.Rich.) Steud.
Tufted annual with culms < 1 m tall and flat, thin leaves < 1 cm wide. Panicles diffuse, elliptic to ovate; spikelets narrowly ovate, < 1 cm long, rather many-flowered.
LL. Dry bushland. Uncommon. Flowers in the wet season.

Sporobolus pellucidus Hochst.
Densely tufted perennial with culms to ca ½ m tall. Panicles open, narrowly oblong, 10–20 cm long; spikelets small (ca. 2 mm long).
LL. Scrub, degraded areas. Uncommon. Flowers in the wet season.

Tribe CYNODONTEAE. – Inflorescences composed of (sub)digitate, slender, 1-sided spikes (in the Simen); spikelets 2- to several-flowered (in the Simen), with a single fertile floret. – In the Simen only represented by the genus *Chloris*.

Chloris gayana Kunth
Robust, stoloniferous perennial with culms to well over 1 m tall. Inflorescence of up to 20 digitate spike to ca. 10 c, long; spikelets 3-(4-)flowered, 2-awned.
LL. Grassland, scrub; clearings in woodland. Uncommon. Flowers in the wet season.

Chloris amethystea Hochst.
Less common than but similar to the above; in general, less tall and less robust. Inflorescences with fewer digitately arranged spikes; spikelets only 2-flowered, with only 1 or no awn.
LL. Grassland with *Acacia*, woodland margins. Rare. Flowers in the wet season.

Tribe PANICEAE. – Inflorescences terminal, rarely axillary (*Snowdenia*), variable, open, contracted or spiciform panicles, or composed of secund racemes in digitate arrangement or on an elongated central axis. Spikelets single, paired or clustered, 2-flowered (lower male or sterile, upper bisexual), commonly awnless, sometimes subtended with bristles (*Pennisetum*); glumes usually membranous.

1 Inflorescences axillary from the upper leaf-sheaths 2
Inflorescences terminal 3

2 Slender perennial with ascending culms < 1 m tall, rooting at lower nodes; spikelets without involucral bristles ..... *Snowdenia mutica*
Robust perennial with stout, erect culms to 3 m tall; inflorescences with spikelets subtended by involucral bristles ..... *Pennisetum trisetum*

3 Inflorescences cylindrical to subglobose; spikelets subtended by involucral bristles ..... *Pennisetum*
Inflorescences not cylindrical; spikelets not subtended by bristles 4

4 Inflorescences open, sparsely branched (lower branches often deflexed) panicles ..... *Panicum hymeniochilum*
Inflorescences of 5–10 erect-ascending racemes on an elongated axis ..... *Brachiaria ramosa*

Brachiaria ramosa (L.) Stapf
Tufted annual with erect, branching culms to ca. ½ m tall and narrowly lanceolate, velvety pubescent leaf-blades. Racemes, 3–6 cm long, on axis ca 6–13 cm long. Spikelets paired.
LL. Rocky slopes. Common. Flowers in the wet season.

Snowdenia mutica (Hochst. ex Fresen.) Pilg.
Slender perennial with ca. 3–7 cm long cylindrical, pedunculate inflorescences, arising solitarily or in pairs from the upper leaf sheaths.
LL. Damp shady places and caves. Rare. Flowering season unknown.
Note. Endemic to the Simen. Never recollected since its discovery in the 19th century.

Pennisetum squamulatum Fresen.
Perennial forming dense tussocks, with ± stout culms to > 1 m tall. Leaves-blades tough, to 2cm wide. Inflorescence linear, 10–20 cm long. Involucral bristles, to 2 cm long, surrounding several male and a terminal bisexual spikelet.
LL. Rocky slopes and disturbed places. Common. Flowers in the wet season.

Pennisetum villosum Fresen.
Low, mat-forming rhizomatous perennial with ascending culms < ½ m long. Inflorescence densely ovoid to subglobose, 5–10 cm long. Involucres comprised of numerous slender bristles to > 5 cm long and softly plumose below, enclosing 1–2 subsessile spikelets.
LL. Roadsides, open grassland. Common. Flowers in the wet season.

Pennisetum humile Hochst. ex A.Rich.
Low, densely tufted perennial with underground rhizomes; culms stiffly erect from an ascending base, to 20 cm long. Distinguished by its small, compact ovoid-oblong head 1–2 cm long. Involucral bristles only to ca. ½ cm long, scarely exceeding the solitary spikelets.
UL. Damp to wet grassy areas. Common. Flowers in the wet season.
Note. The only Simen Upland *Pennisetum*; endemic to the Ethiopian mountains.

Pennisetum trisetum Leeke
Robust perennial with stout, hardened culms to 3 cm tall. Inflorescence loose, slender, 2–7 cm long. Involucres with 1 bristles to ca. 1 cm long and several small bristles, enclosing a solitary spikelet.
LL. Forest clearings; open, disturbed places. Common. Flowers in the wet season.

Pennisetum beckeroides Leeke
A very rare Simen Lowlands endemic. Never recollected since its discovery in the 19th century and very close to the preceding species.

Panicum hymeniochilum Nees
Semi-aquatic stoloniferous annual or short-lived perennial with weak slender culms rooting at the lower nodes. Panicle small, only 2–9 cm long.
LL. Swampy areas, along streams, wet grassland. Uncommon. Flowers in the wet season.

Tribe ANDROPOGONEAE. – Inflorescences composed of fragile racemes, these frequently paired or single or in digitate arrangement (or, not in the Simen, in various other arrangements). Racemes made up of paired spikelets (with a terminal triad), mostly 1 sessile (and bisexual) and the other pedicelled (and male or sterile). Spikelet with or without awns. Glumes usually as long as the spikelets and enclosing the florets, rigid and firm.

1 Racemes with stout awns to > 10 cm long ..... *Exotheca abyssinica*
Racemes with considerably shorter awns (not longer than ca. 3 cm) ..... *Andropogon*

Andropogon lima (Hack.) Stapf
Perennial forming dense tussocks, with erect culms to > 1 m. Racemes terminal, paired, 5–15 cm long. Upper lemma of sessile spikelet with a geniculate awn to 1.5 cm long.

LL. Grassland. Uncommon. Flowers in the wet season.

Andropogon amethystinus Steud.
Tufted perennial with ascending to erect culms to ca. ½ m long. Racemes similar to *A. lima* but with geniculate awn to ca. 2 cm long.
(LL, ESC). **UL**. Grassland and open areas in *Erica* forest: in cracks of rocks, often in ± wet situations. Common. Flowers in the wet season.

Andropogon abyssinicus Fresen.
Loosely tufted annual with ascending culms < 1 m long. Racemes similar to *A. lima*, but with geniculate awn to ca. 3 cm long.
LL. Mostly in disturbed areas. Common. Flowers in the wet season.

Andropogon chrysostachyus Steud.
Tufted perennial with tough horizontal rootstock and erect culms to c. 1 m tall. Inflorescences composed of several subdigitate golden-brown racemes ca. 4–14 cm long. Upper lemma of sessile spikelet with an awn to 1.5 cm long.
LL. Grassland; often dominant in overgrazed areas. Common. Flowers in the wet season.

Exotheca abyssinica (Hochst. ex A.Rich.) Anderss.
Tussock-forming perennial with erect culms to 1.5 m tall. Inflorescences composed of a few raceme-pairs gathered into a compound panicle. Each raceme with an awnless spikelet-pair below and a terminal spikelet triad, of which the fertile sessile spikelet has a stout bigeniculate awn to 11 cm long (produced by the upper lemma).
LL, (ESC). Grassland, open areas in *Erica* forest. Common. Flowers in the wet season.

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Abbreviations in the Botanical Part

UL, Simen Uplands

LL, Simen Lowlands

ESC, escarpment areas between UL and LL

For details and further information on the format of the Botanical Part see page 36.

>

Old, tall flowering inviduals of the Giant Lobelia *Lobelia rhynchopetalum* (Lobeliaceae) (Saha area of the Simen Mountains National Park)

View from the Simen Uplands (Saha area of the Simen Mountains National Park) towards the Lowlands

Scripta Botanica Belgica **37**

C. Puff
Sileshi Nemomissa

PLANTS OF THE SIMEN

A FLORA OF THE SIMEN MOUNTAINS AND SURROUNDINGS, NORTHERN ETHIOPIA

This book covers 101 families (gymnosperms: 1; dicots: 79; monocots: 21), close to 300 genera and 545 species recorded from the Simen and surroundings. Brief descriptions are provided for all taxa, and keys are generally included if a family is represented by 3 or more taxa. A total of 305 taxa is illustrated in 118 figures (consisting of close to 600 individual pictures). Descriptions and corresponding illustrations are always on the same or on facing pages.

The book also provides general information on the Simen Mts. (geology, climate, habitats, people, wild animals), and includes practical tips for those wishing to stay in the mountains for a longer period of time (places to stay; suggested trekking routes, etc.).

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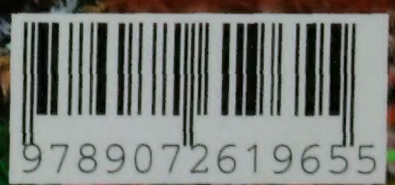
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